

# MICHAEL BINDS

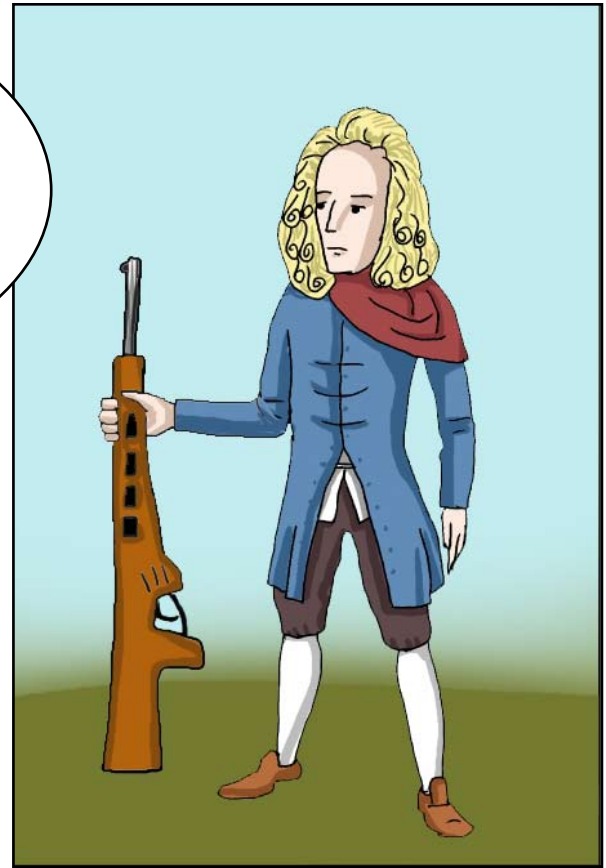
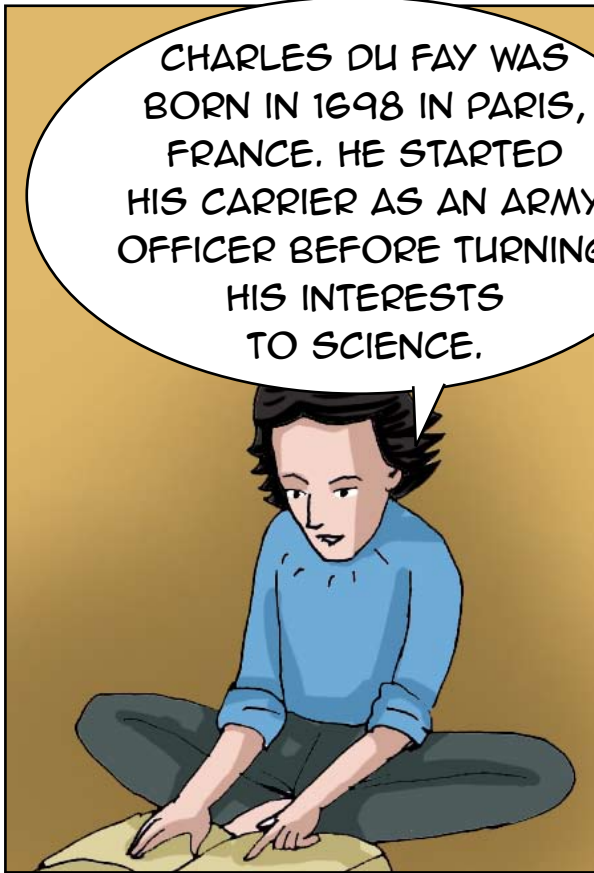
## THE HISTORY OF ELECTRICITY

NEXT DAY, MICHAEL WAS VERY EXCITED TO GET BACK TO WORK.

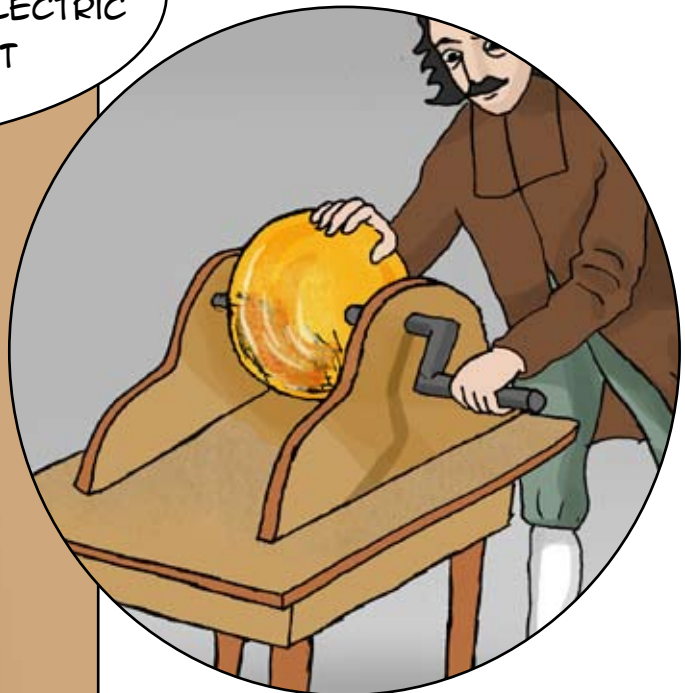
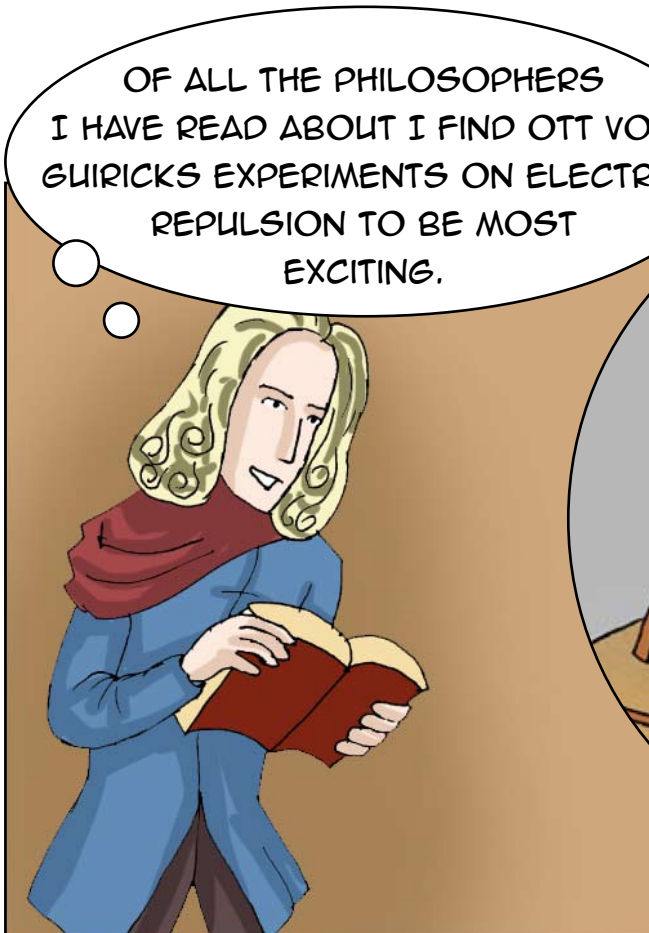


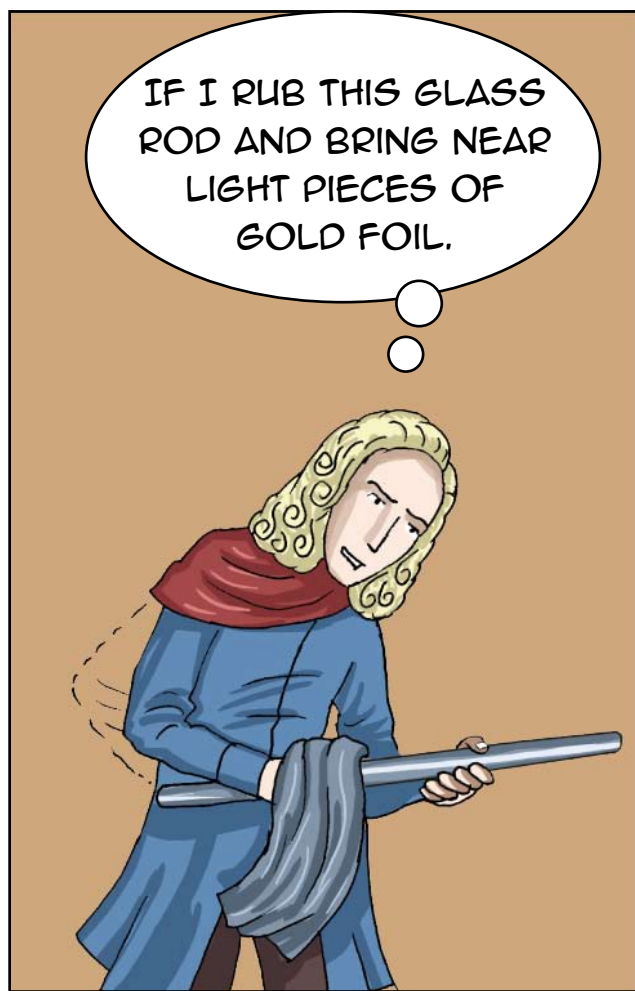
THE BOOK MICHAEL PICKED WAS ABOUT CHARLES DUFAY.

CHARLES DU FAY WAS BORN IN 1698 IN PARIS, FRANCE. HE STARTED HIS CARRIER AS AN ARMY OFFICER BEFORE TURNING HIS INTERESTS TO SCIENCE.



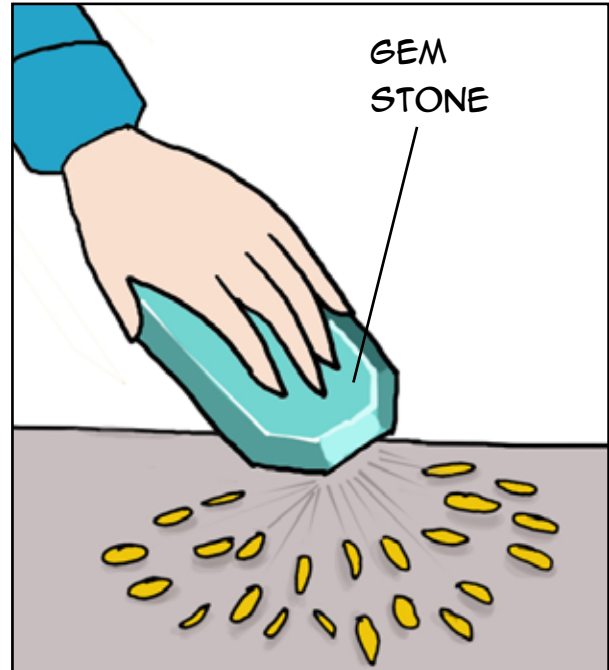
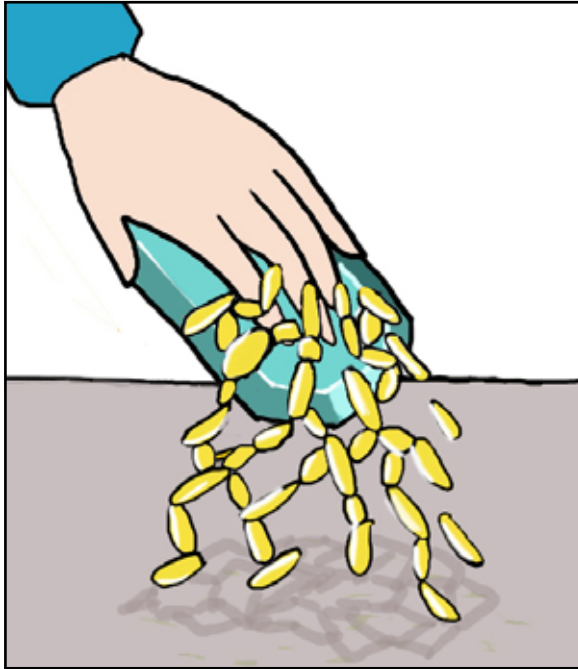
OF ALL THE PHILOSOPHERS I HAVE READ ABOUT I FIND OTT VON GUIRICKS EXPERIMENTS ON ELECTRIC REPULSION TO BE MOST EXCITING.



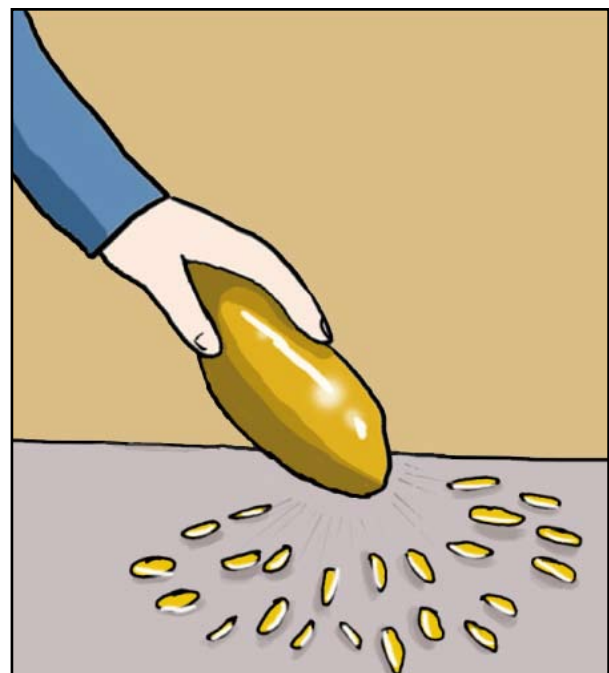
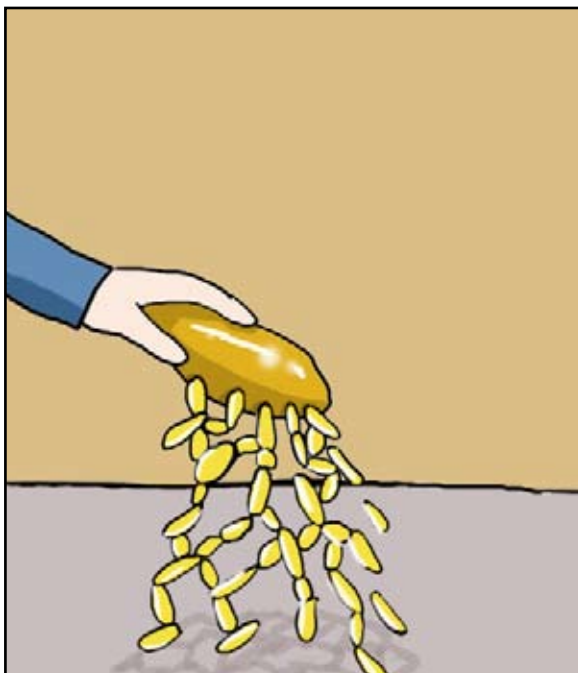




IF I USE A GEM STONE INSTEAD OF GLASS ROD THEN ALSO IT FIRST ATTRACTS AND THEN REPELS THE SAME GOLD FOIL.



EVEN IF I USE AMBER, IT ATTRACTS THE GOLD FOIL FIRST AND THEN REPELS LIKE GLASS OR GEM.



THEN DUFAY DECIDED TO DO SOMETHING DIFFERENT

FIRST HE RUBBED A GLASS ROD AND BROUGHT IT NEAR GOLD FOIL. THE GOLD FOIL GOT ATTRACTED TO IT.



THEN HE RUBBED AN AMBER STONE AND BROUGHT IT NEAR THE SAME GOLD FOIL. INSTEAD OF REPELLING, THE GOLD FOIL GOT ATTRACTED TO IT!!

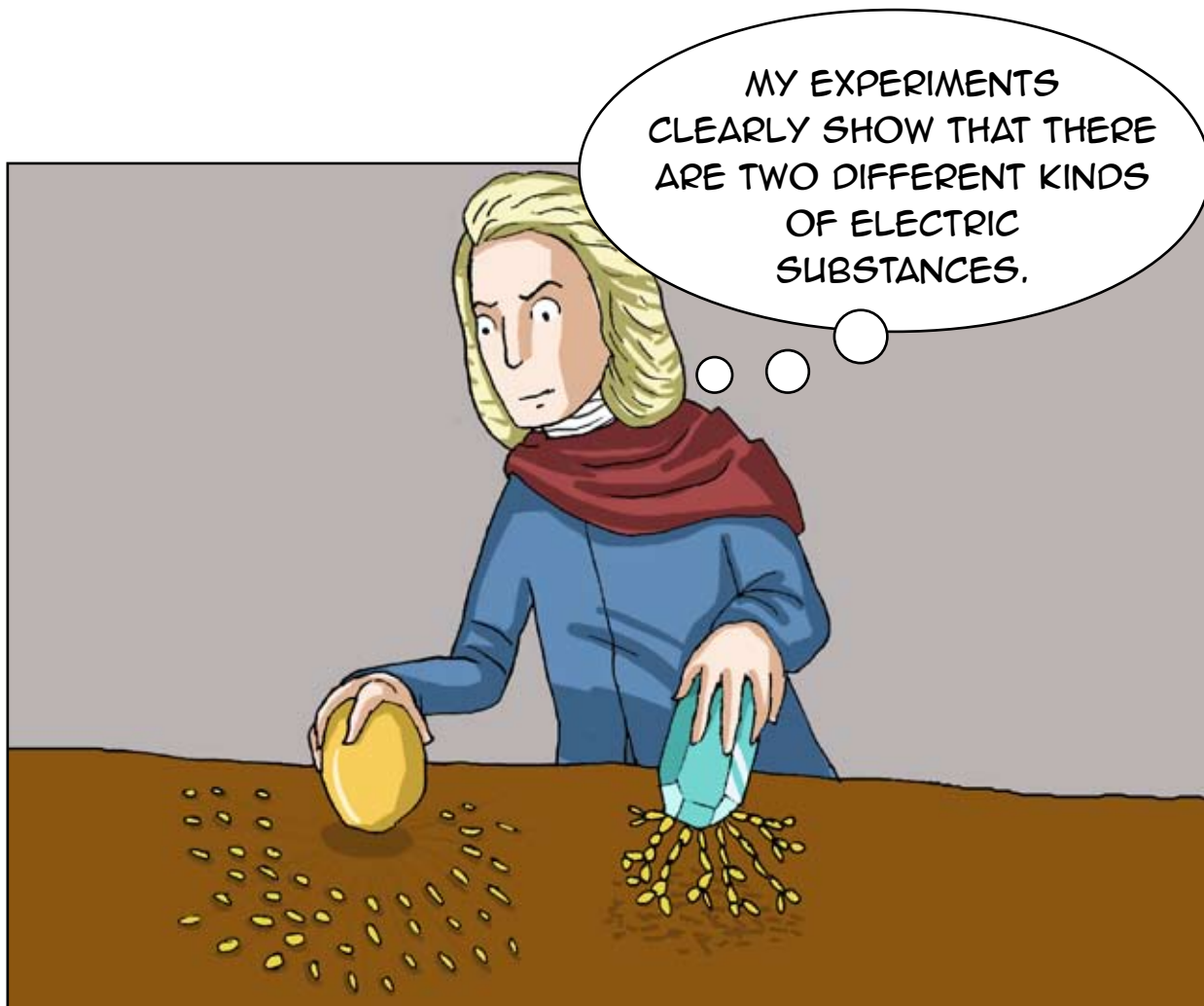


HOW COME AMBER IS ATTRACTING THE GOLD FOIL THE SECOND TIME?



I NEED TO CONDUCT MORE EXPERIMENTS WITH DIFFERENT MATERIALS...





THOSE THAT ARE OILY IN  
NATURE, LIKE AMBER, WAX  
AND GUM, I CALL THEM  
RESINOUS ELECTRICS

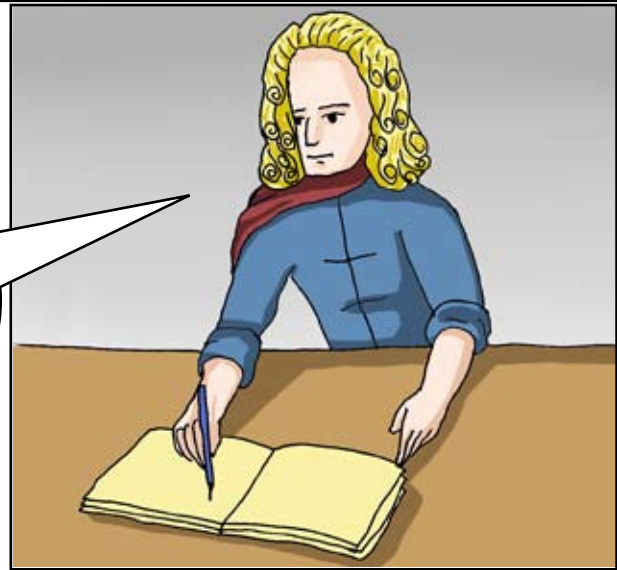


AND THOSE THAT ARE  
TRANSPARENT AND GLASSY IN  
NATURE, LIKE GEMSTONES AND  
GLASS, I CALL THEM VITREOUS  
ELECTRICS



AND SO DU FAY WROTE DOWN HIS TWO FLUID THEORY OF ELECTRICITY.

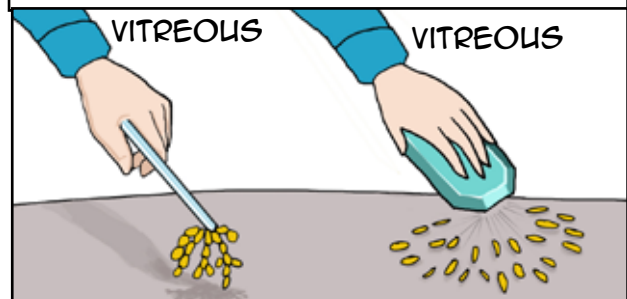
DEAR MEMBERS OF THE SCIENTIFIC COMMUNITY, I HAVE DISCOVERED THAT THERE ARE TWO TYPES OF ELECTRIC SUBSTANCES, RESINOUS AND VITREOUS



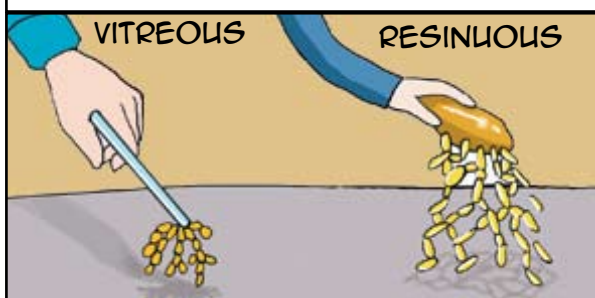
GOLD FOIL ATTRACTED BY RESINOUS WILL BE REPELLED BY ANOTHER RESINOUS MATERIAL



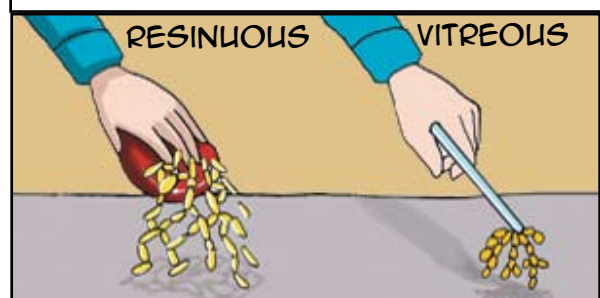
AND GOLD FOIL ATTRACTED BY VITREOUS WILL BE REPELLED BY ANOTHER VITREOUS MATERIAL



BUT GOLD FOIL ATTRACTED BY VITREOUS WILL BE ATTRACTED TO ANOTHER RESINOUS MATERIAL

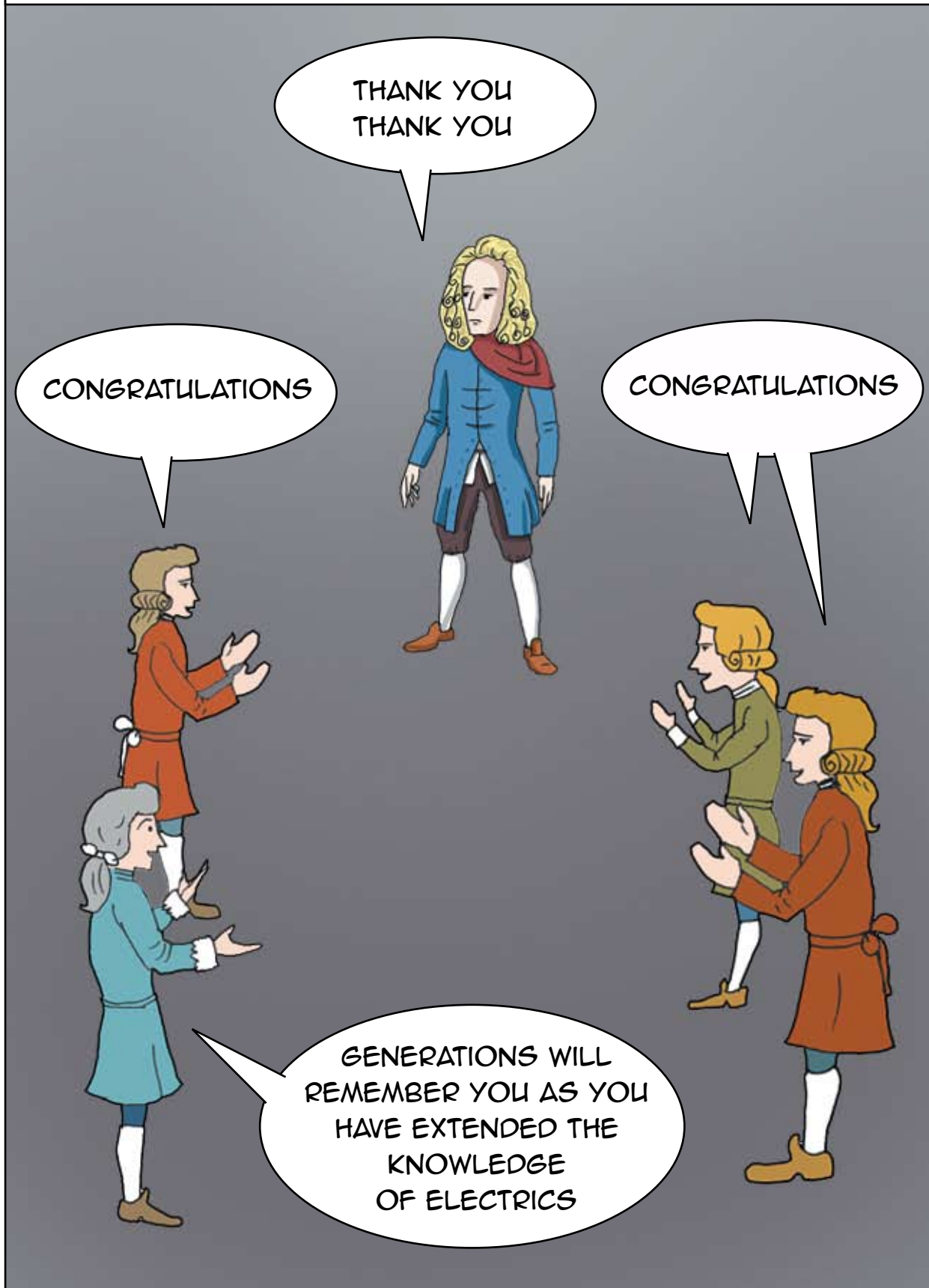


AND GOLD FOIL ATTRACTED BY RESINOUS WILL BE ATTRACTED TO ANOTHER VITREOUS MATERIAL





DU FAY'S TWO FLUID THEORY OF ELECTRICITY WAS THE FIRST COMPREHENSIVE THEORY THAT EXPLAINED THE PHENOMENON OF REPULSION IN ELECTRIC SUBSTANCES.





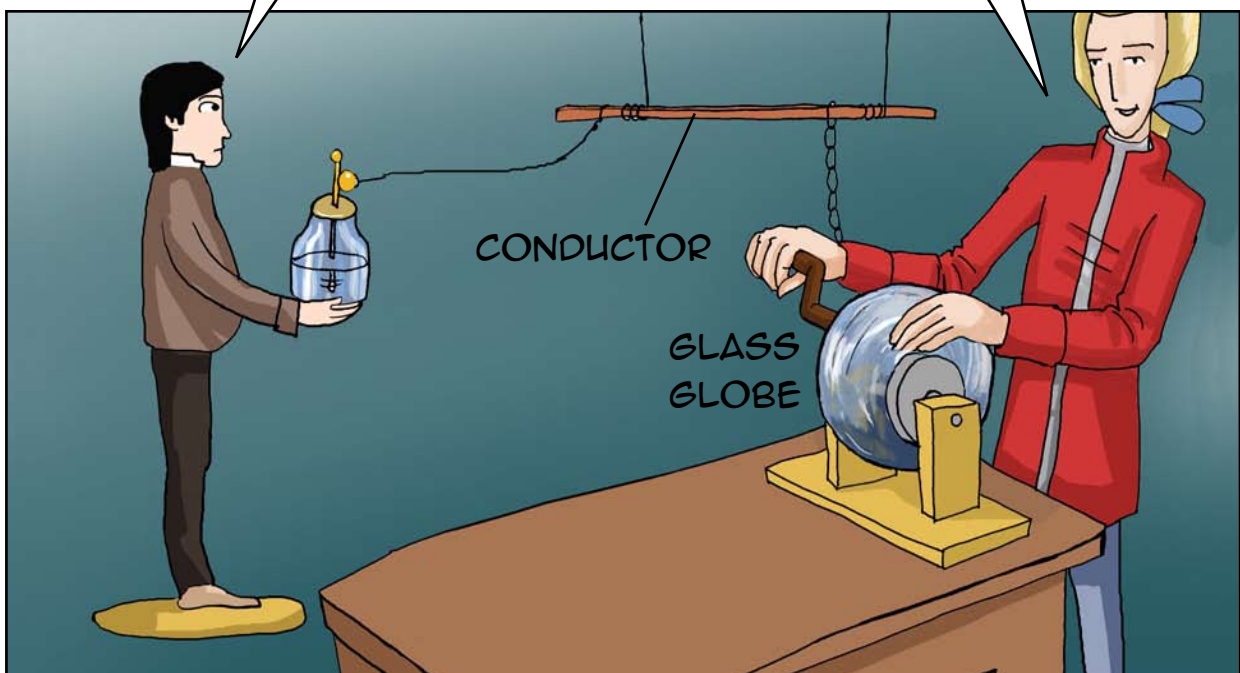
THE NEXT BOOK THAT MICHAEL GOT SET TO BIND WAS ABOUT A DUTCH SCIENTIST CALLED PIETER VAN MUSSCHENBROEK. HE LIVED IN LEYDEN, HOLLAND IN 1790 S.

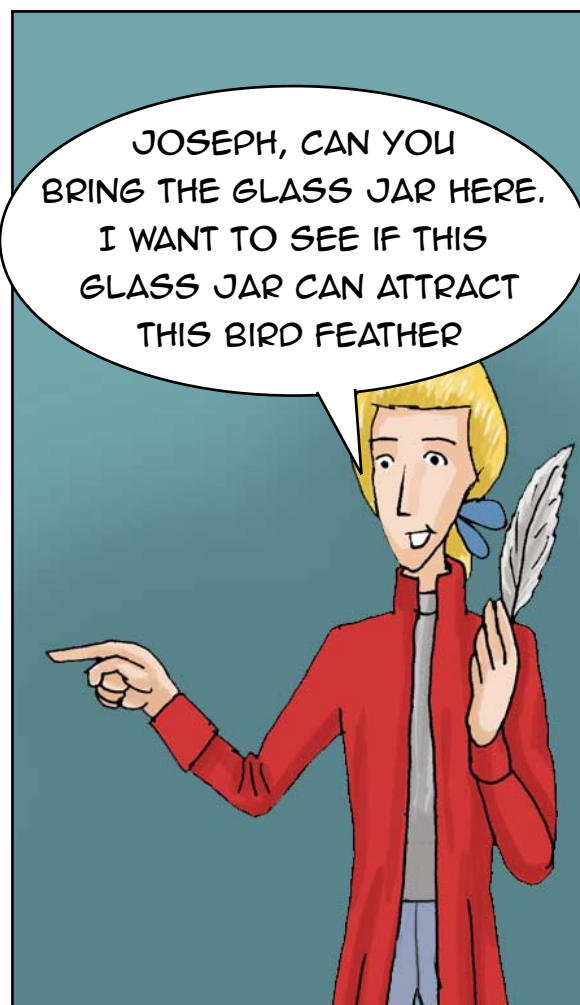


MUSSCHENBROEK ONE DAY ASKED HIS ASSISTANT TO HELP HIM IN AN EXPERIMENT.

SIR, WITH DUE RESPECT, MAY I KNOW WHAT WE ARE TRYING TO DO HERE?

IF ELECTRICITY IS A FLUID, THEN WE SHOULD BE ABLE TO STORE IT. NOW BE PATIENT AND HOLD THAT GLASS JAR STEADILY





AS SOON AS JOSEPH  
DISCONNECTED THE CONDUCTOR...



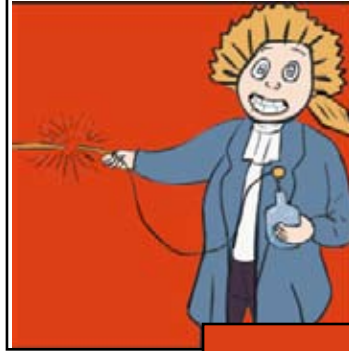




WHAT HAVE I CREATED?  
I MUST SHOW IT TO MY  
FRIENDS



AS PETER VON SHOWED THE  
SHOCK COMING FROM THE  
JAR, THEY GOT MORE IN-  
TERESTED IN GETTING THE  
EXPERIENCE THAN THINKING  
OF THE REASONS BEHIND IT.



AS A RESULT, MANY PEOPLE STARTED USING THE ELECTRIC  
JAR AS A SOURCE OF ENTERTAINMENT. THEY HOSTED PUBLIC  
SHOWS TO GIVE SHOCK TO PEOPLE.



BUT DOCTORS IN GERMANY USED THE GLASS JAR FOR TREATING PATIENTS WHO SUFFERED FROM MUSCLE SPASM. WITH A SMALL ELECTRIC SHOCK, THE PASSIVE MUSCLE OF PATIENT BECAME ACTIVE.



THIS GLASS JAR WHICH STORED ELECTRICITY WAS LATER CALLED AS THE LEYDEN JAR BECAUSE IT WAS INVENTED IN THE CITY OF LEYDEN IN NETHERLANDS

IT IS SAID THAT THE LEYDEN JAR WAS ALSO INDEPENDENTLY INVENTED BY ANOTHER DUTCH SCIENTIST FROM THE SAME CITY OF LEYDEN. HIS NAME WAS VON KLEIST.





NEXT DAY, MICHAEL GOT READY TO BIND AND READ ANOTHER BOOK ON ELECTRICITY. THIS WAS THE BOOK ABOUT THE FAMOUS BENJAMIN FRANKLIN WHO LIVED IN AMERICA IN THE 18TH CENTURY.



FROM THE YEAR 1740 ONWARDS, HE STARTED PERFORMING SCIENTIFIC EXPERIMENTS. ONE DAY...

AHA... MY FRIEND FROM ENGLAND HAS SENT ME A GIFT. CAN'T WAIT TO SEE WHAT'S IN IT.



IT'S THE FIRST TIME I AM READING ABOUT SOME PHILOSOPHER FROM AMERICA...

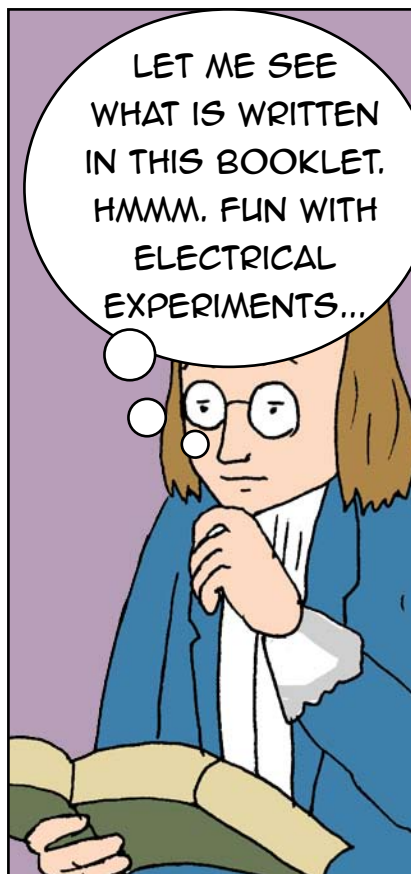


BENJAMIN FRANKLIN STARTED HIS CAREER AS A JOURNALIST. LATER HE BECAME A POLITICIAN AND ONLY AFTER HIS RETIREMENT DID HE DIVERT HIS INTERESTS TO SCIENTIFIC EXPERIMENTS

WHAT IS THIS? A GLASS ROD, A LEYDEN JAR, GOLD FOIL, AMBER AND A BOOKLET. WHAT KIND OF A STRANGE GIFT IS THIS? WHAT USE ARE THESE THINGS TO ME?







LET ME SEE  
WHAT IS WRITTEN  
IN THIS BOOKLET.  
HMMM. FUN WITH  
ELECTRICAL  
EXPERIMENTS...



AFTER MANY DAYS, FRANKLIN'S  
FRIEND PAID HIM A VISIT

HEY FRANKLIN,  
DID YOU LIKE THE  
GIFT I SENT  
YOU?

INDEED!  
ALL ELECTRICAL  
EXPERIMENTS ARE  
EQUALLY FASCINATING,  
BUT AT THE SAME TIME  
VERY PUZZLING,  
LIKE...

...IF SOMEONE TOUCHED  
THE LEYDEN JAR WHICH WAS  
KEPT ON A TABLE, THERE  
WAS NO SHOCK FROM IT  
EVEN IF THE JAR WAS FULL  
OF ELECTRIC FIRE!

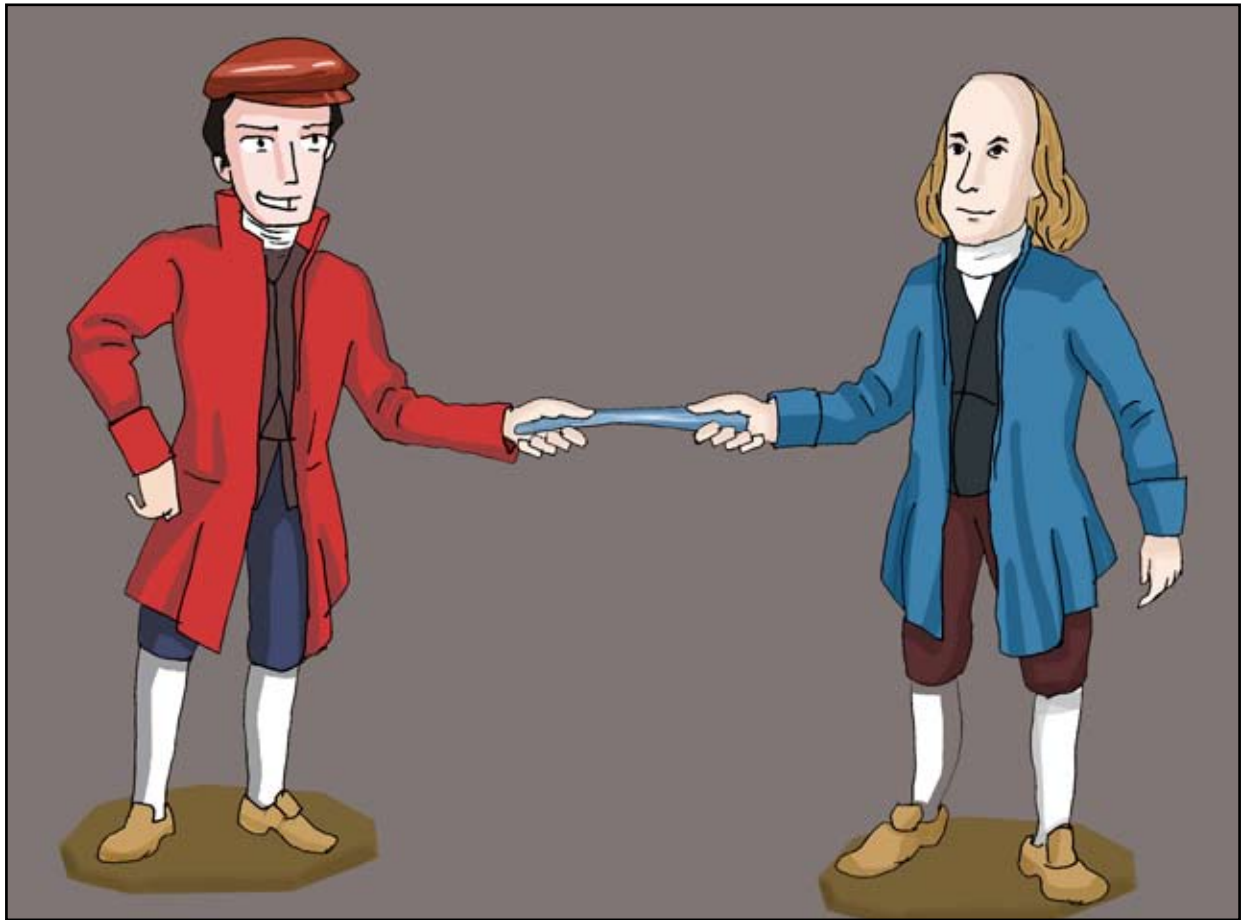


THE SHOCK FROM LEYDEN JAR  
CAME ONLY WHEN IT WAS HELD  
WITH ONE HAND AND ITS NAIL  
WAS TOUCHED WITH ANOTHER.



BY NOW THE ELECTRIC SUBSTANCE WAS CONSIDERED TO BE  
MORE LIKE FIRE THAN LIKE A FLUID

NOT JUST THAT... IF TWO PEOPLE STAND ON WAX OR AMBER  
HOLDING A GLASS ROD ON BOTH ENDS...



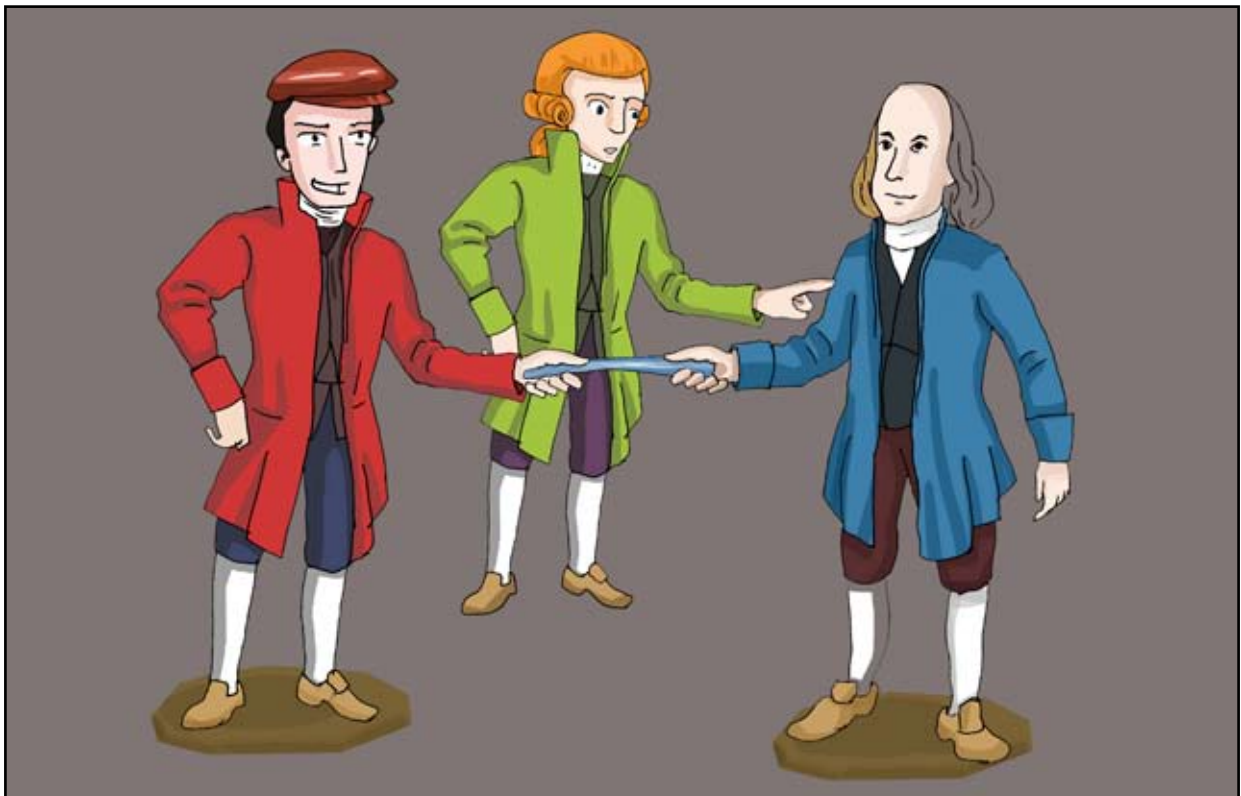
AND IF ONE OF THEM RUBS THE GLASS ROD WITH HAND OR CLOTH



THEN, AFTERWORDS WHEN BOTH MEN BRING THEIR FINGERS NEAR EACH OTHER, THERE IS A MILD SHOCK EXPERIENCED BY BOTH

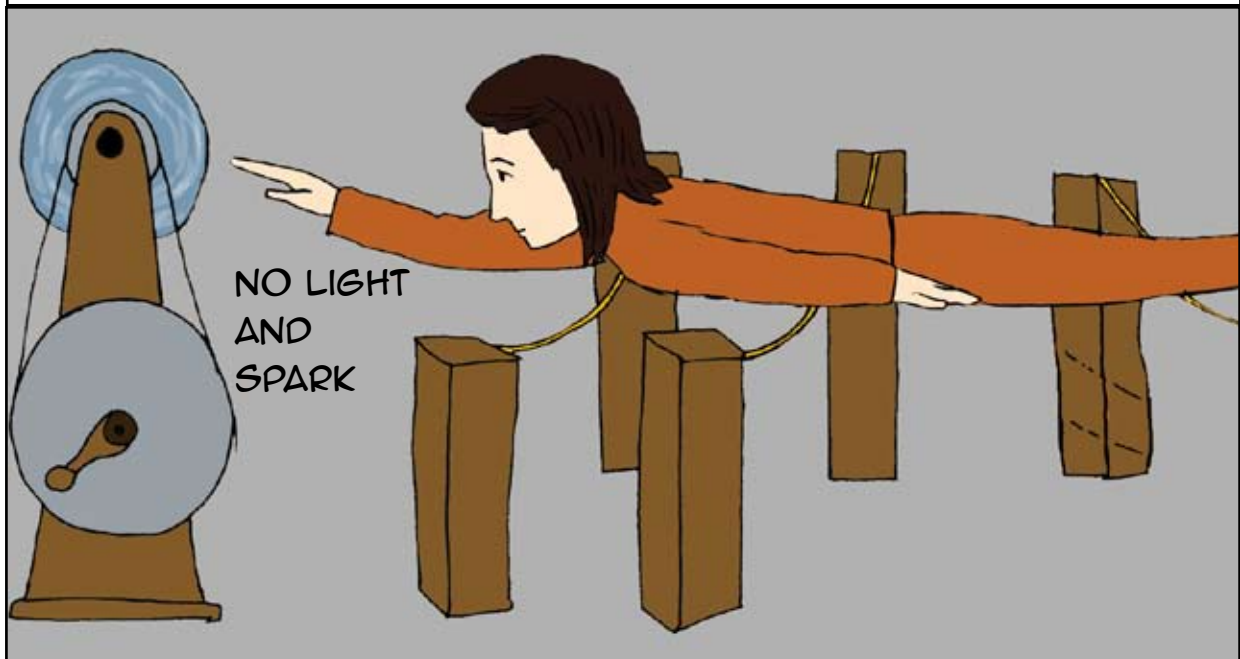


BUT AFTER RUBBING THE ROD, IF A THIRD PERSON TOUCHED ANY OF THE OTHER TWO ANYWHERE ON THEIR BODY, HE WOULD NOT RECIEVE ANY SHOCK...

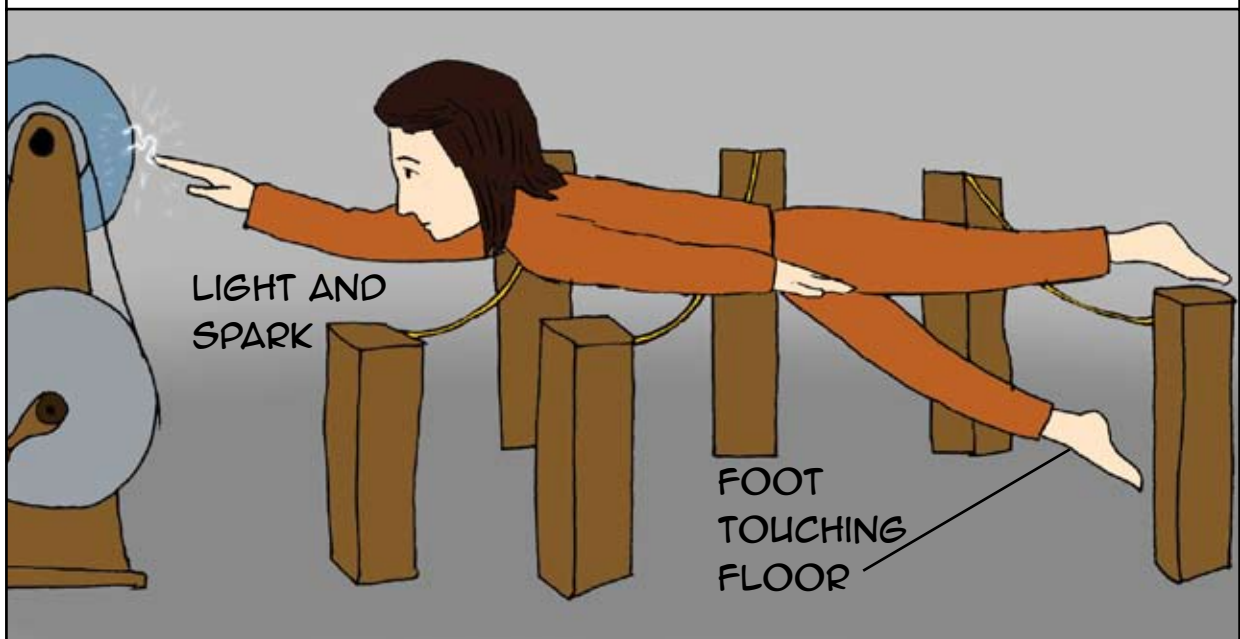




I ALSO DID EXPERIMENTS WITH ELECTRIC GENERATOR AND FOUND THAT THERE IS ABSOLUTELY NO SHOCK IF THE PERSON TOUCHING THE ELECTRIC GLOBE IS SUSPENDED IN AIR.



BUT IF THE SAME PERSON PUT ONE FOOT ON THE GROUND AND SIMULTANEOUSLY BROUGHT A FINGER NEAR AN EXCITED GLASS GLOBE, THERE EMERGED A MILD ELECTRIC FIRE FROM THE GLOBE



ELECTRIC GENERATOR WAS DEVELOPED BY OTTO VON GUIRICK

SO, I CAME TO SOME CONCLUSIONS WHICH CONTRADICT WITH WHAT WE CURRENTLY UNDERSTAND ABOUT THIS ELECTRICAL PHENOMENON.

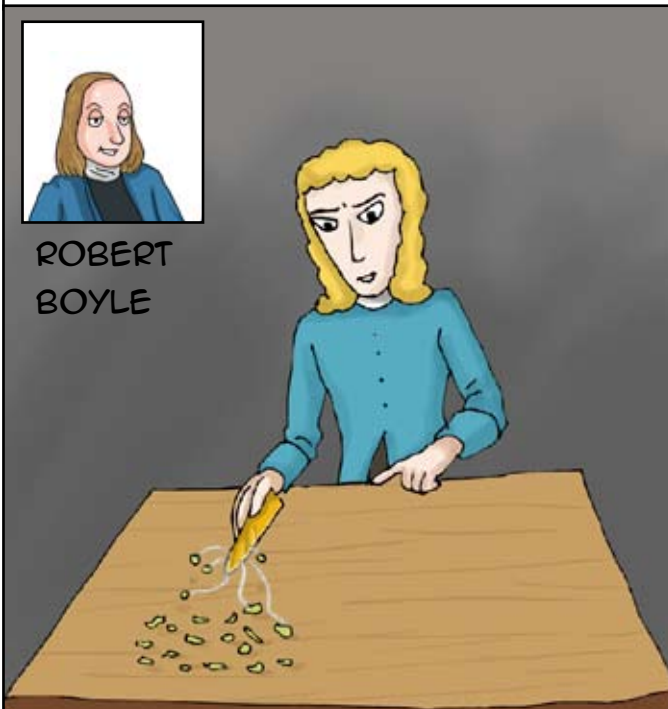
WHAT ARE YOUR CONCLUSIONS?



MY FIRST CONCLUSION IS THAT WHEN AMBER OR ANY ELECTRIC IS RUBBED, IT DOES NOT GENERATE ELECTRICITY AS ROBERT BOYLE BELIEVED.



ROBERT  
BOYLE



I PROPOSE THAT ELECTRIC FLUID IS ALWAYS PRESENT IN ALL SUBSTANCES.



WHEN WE GIVE FRICTION BY RUBBING, IT DISTURBS THE BALANCE AND THE ELECTRIC FLUID GETS REMOVED FROM ONE SUBSTANCE AND GETS COLLECTED IN THE OTHER



EVEN IF WE ASSUME THAT WHAT YOU ARE SAYING IS TRUE, HOW DOES IT EXPLAIN THE PHENOMENON OF ATTRACTION AND REPLUSION IN ELECTRICS?



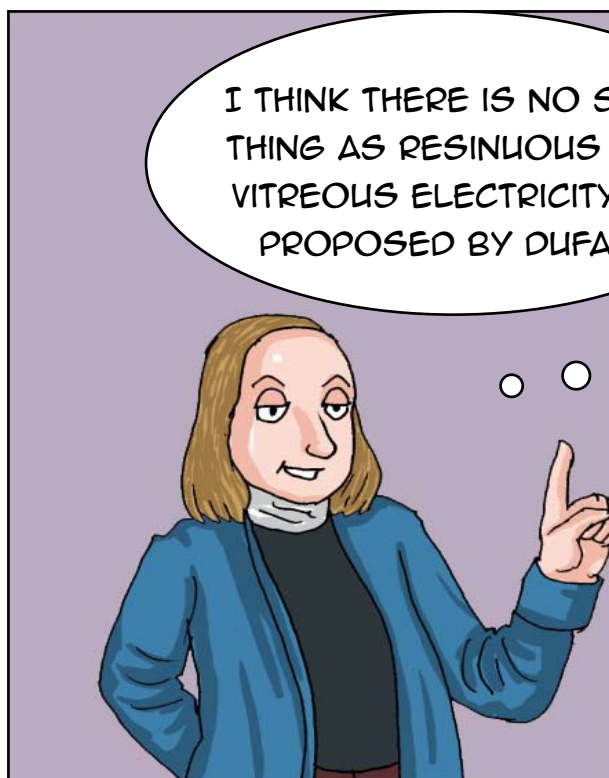
MY SECOND CONCLUSION WILL ANSWER THAT



WHAT IS YOUR SECOND CONCLUSION?



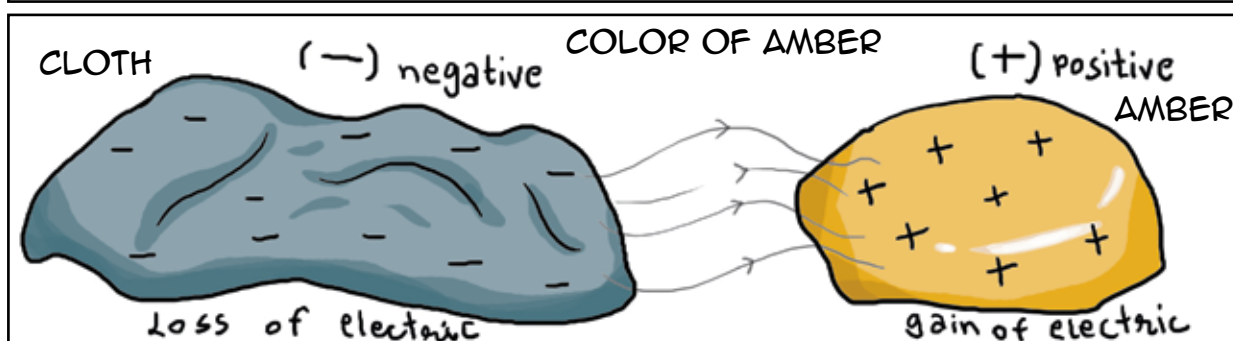


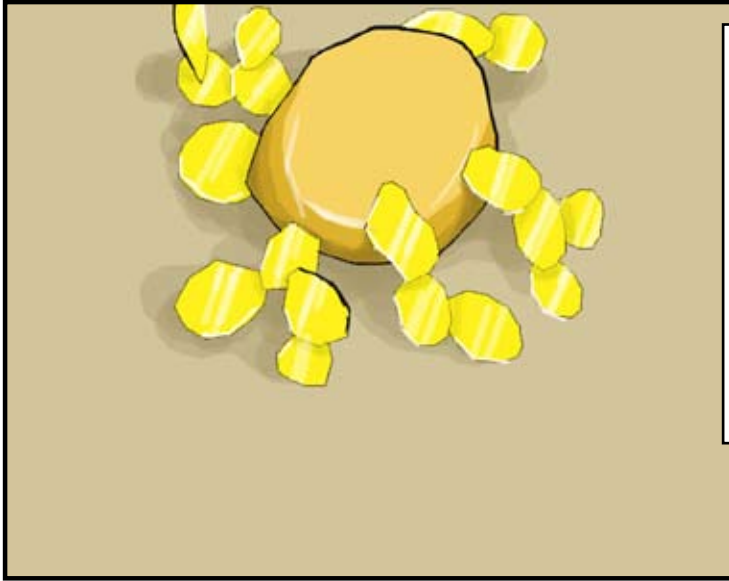


AS I SAID EARLIER, WHEN TWO THINGS ARE RUBBED, ONE GAINS THE ELECTRIC FLUID AND AN EQUAL AMOUNT IS LOST BY THE OTHER

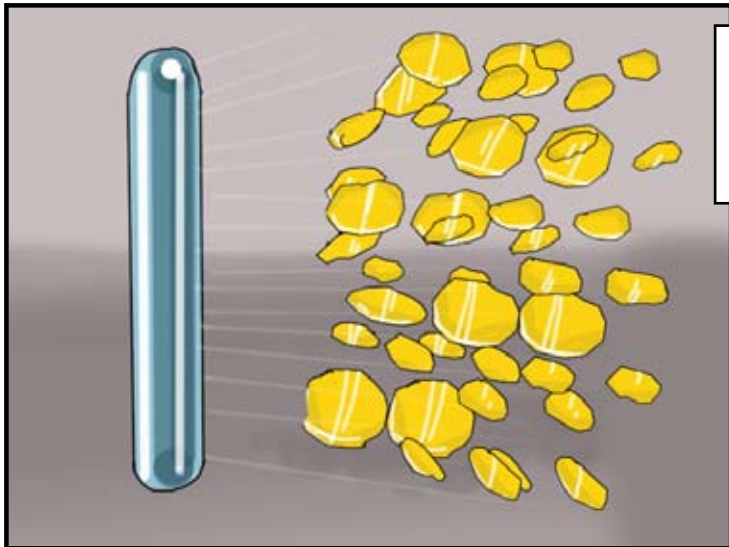


THAT WHICH LOOSES THE ELECTRIC FLUID, LET US CALL IT NEGATIVE AND THAT WHICH GAINS, LET US CALL IT POSITIVE

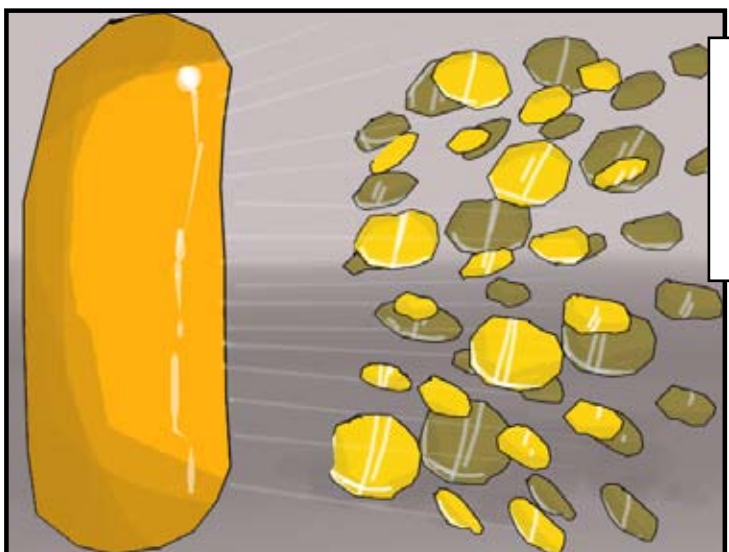




SO MY SECOND CONCLUSION IS:  
THAT WHENEVER A  
NEGATIVE ELECTRIC  
COMES IN THE PRESENCE  
OF A POSITIVE ELECTRIC,  
THEY ATTRACT EACH  
OTHER



AND WHENEVER POSITIVE  
AND POSITIVE COME NEAR  
EACH OTHER, THEY REPEL



SIMILARLY WHEN  
NEGATIVE AND NEGATIVE  
COME NEAR THEY ALSO  
REPEL EACH OTHER

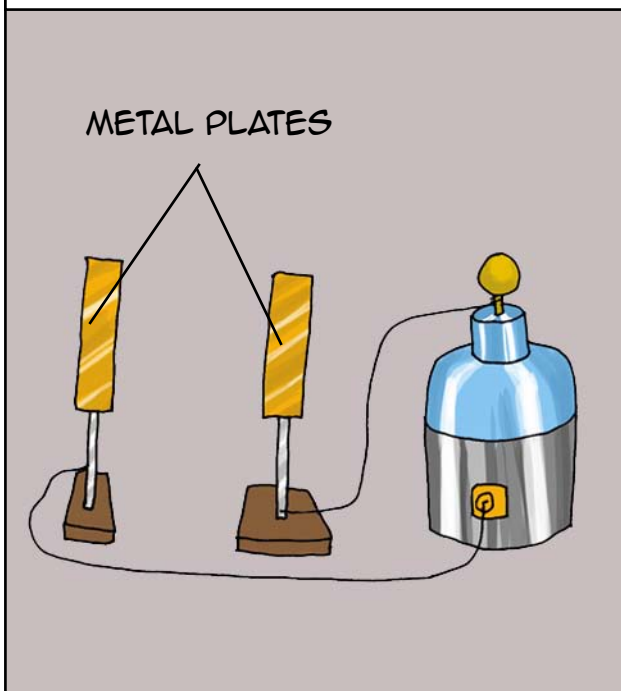
I HAVE EVEN DEVELOPED AN EXPERIMENT TO PROVE THAT POSITIVE AND NEGATIVE ELECTRIC EXIST.



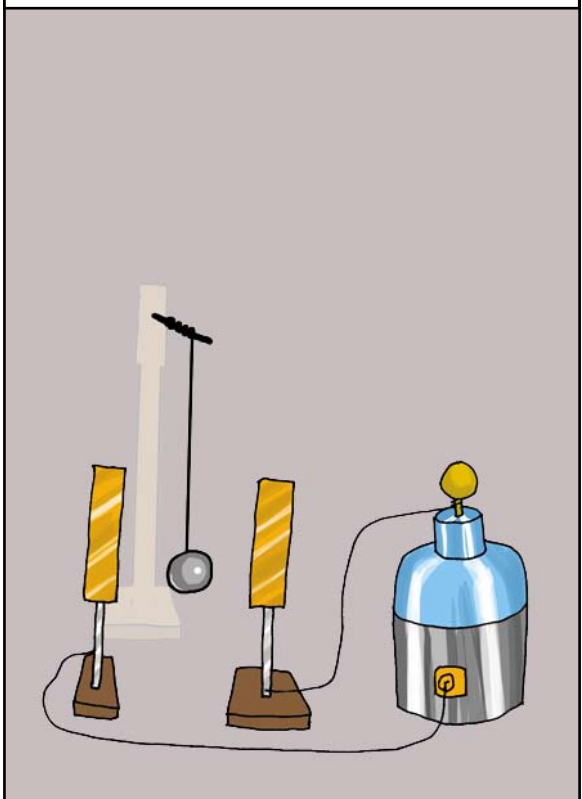
I AM EAGER TO SEE THAT EXPERIMENT



IN THIS EXPERIMENT, I CONNECT THE NAIL AND OUTER SURFACE OF THE LEYDEN JAR WITH TWO CONDUCTING METAL DISKS

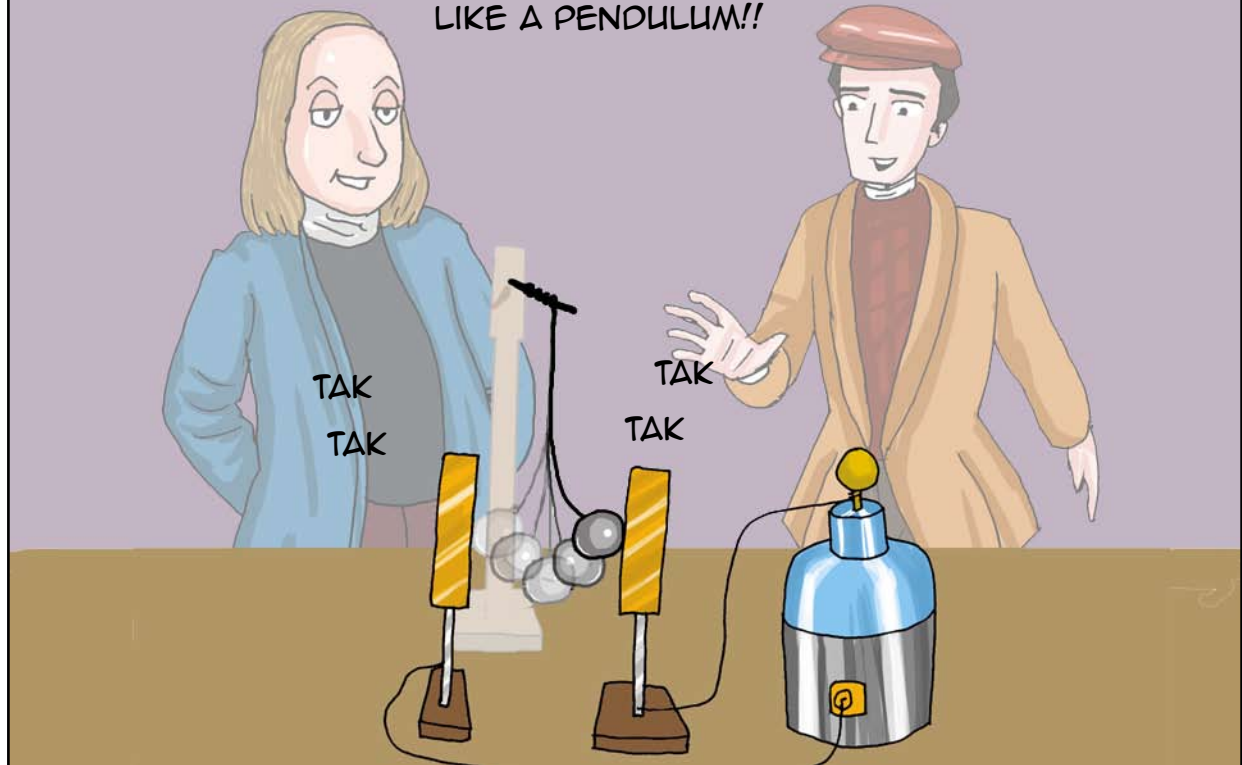


NOW, I PLACE METAL BOB BETWEEN THE METAL PLATES. OBSERVE WHAT HAPPENS

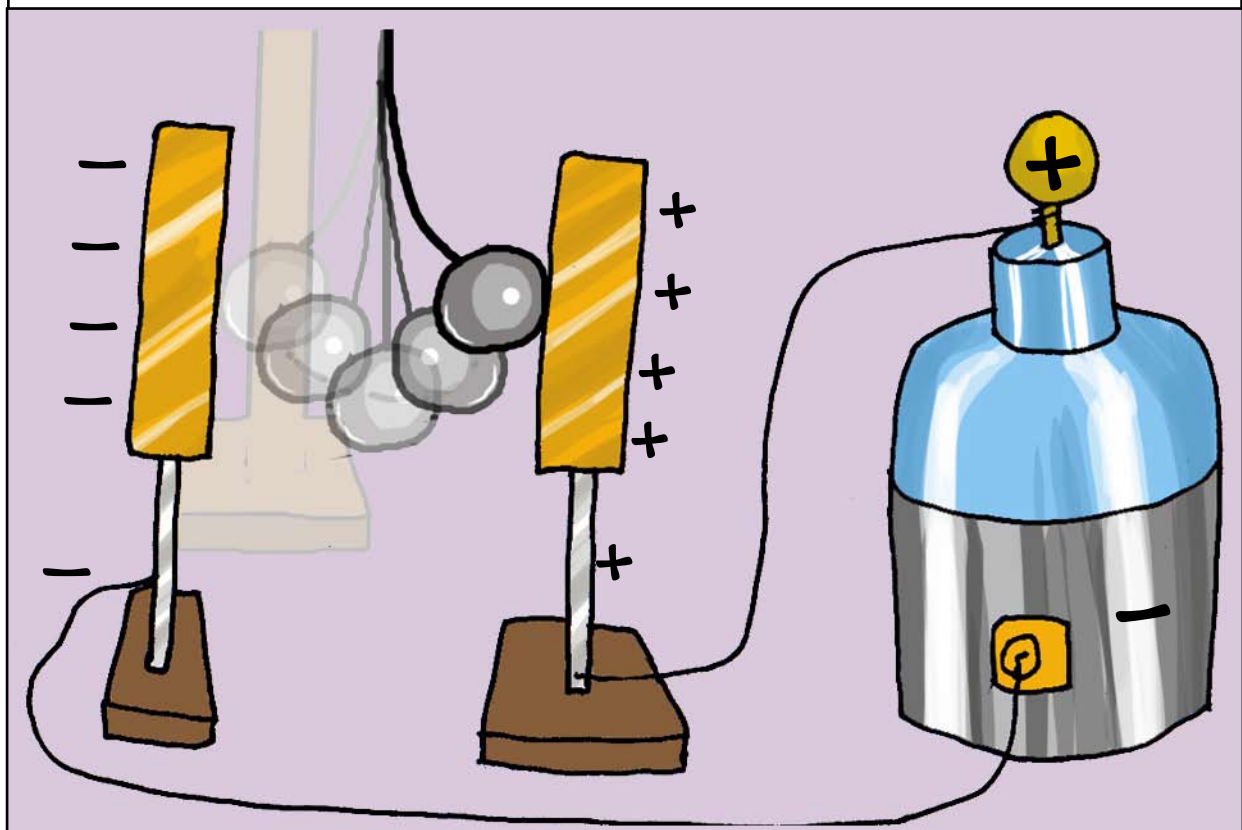




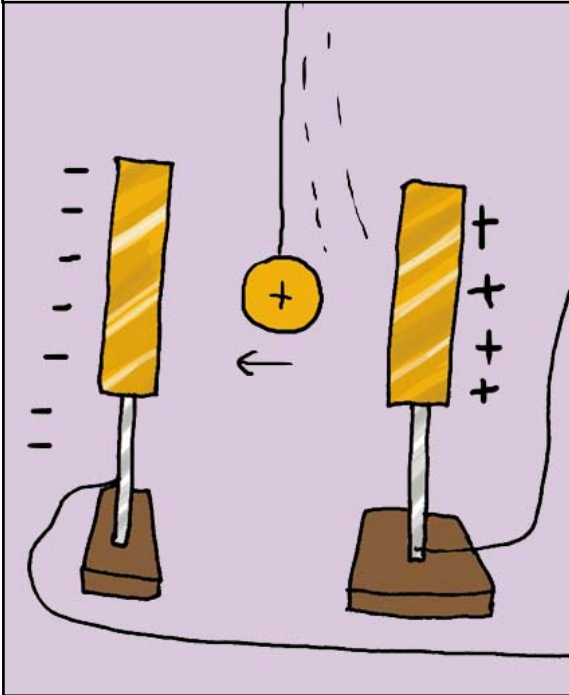
MY GOD, THE BOB IS OSCILATING  
BETWEEN THE TWO METAL CONDUCTORS  
LIKE A PENDULUM!!



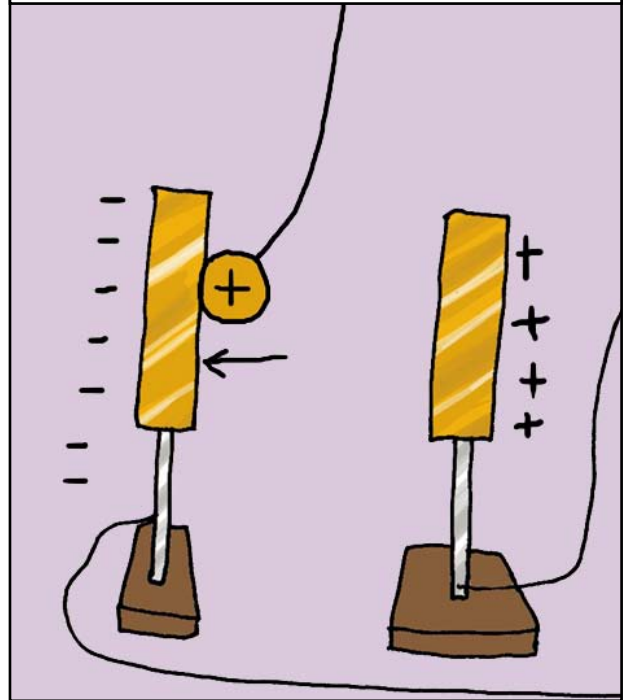
THE HANGING BOB FIRST GETS ATTRACTED TO THE POSITIVE PLATE



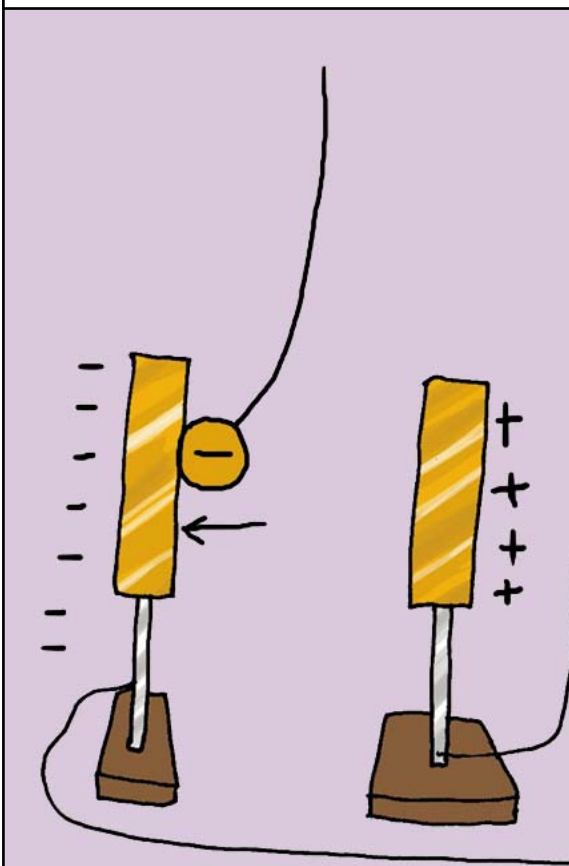
BOB BECOMES POSITIVE BY CONTACT WITH POSITIVE PLATE AND IS REPELLED FROM IT



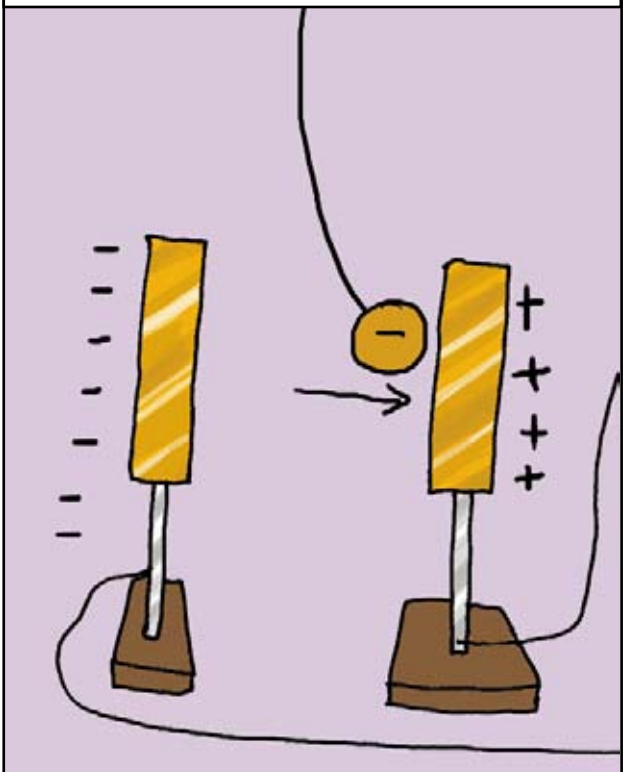
POSITIVE BOB GETS ATTRACTED TO NEGATIVE PLATE.



TOUCHING THE NEGATIVE PLATE BOB BECOMES NEGATIVE



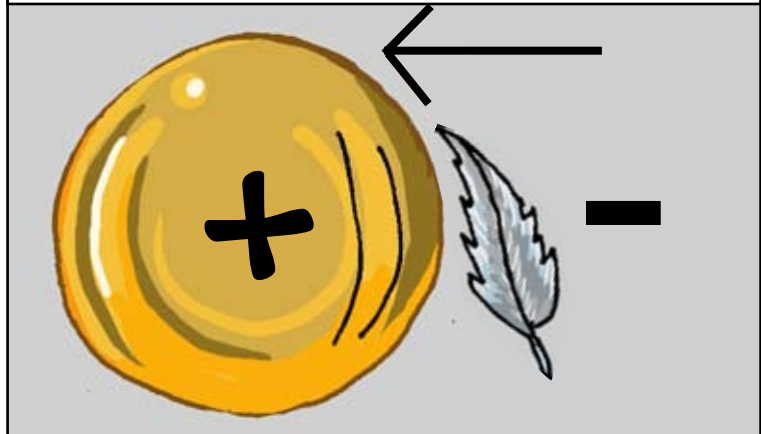
THE NEGATIVE BOB AGAIN GETS ATTRACTED TO POSITIVE PLATE. AND IT GOES ON TILL THERE IS ELECTRIC FIRE IN THE JAR.



YOUR THEORY  
EXPLAINS REPULSION  
IN ELECTRICS SO  
WELL



WHEN WE RUB A GLOBE, IT BECOMES  
POSITIVE BY COLLECTING ELECTRIC  
FIRE FROM HAND OR CLOTH. A  
FEATHER GETS ATTRACTED TO THE  
GLOBE BECAUSE IT HAS LESS  
ELECTRIC AND IS NEGATIVE



BUT AFTER TOUCHING THE  
GLOBE, THE FEATHER ALSO  
BECOMES POSITIVE  
AND SINCE SAME ELECTRICS  
REPEL, THE FEATHER GETS  
REPELLED FROM THE GLOBE.



I JUST GAVE YOU  
SOME TOYS TO PLAY WITH  
AND YOU CREATED A THEORY  
OUT OF IT. THIS IS TRULY  
AMAZING! YOU MUST  
WRITE ABOUT YOUR  
DISCOVERY!





AND SO FRANKLIN WROTE ABOUT HIS THEORY OF ELECTRICITY.

FELLOW PHILOSOPHERS OF ELECTRICITY. I HAVE COME TO SOME FIRM CONVICTION ABOUT THE NATURE OF THIS MAGNIFICENT PHENOMENON. THESE ARE MY FINDINGS:

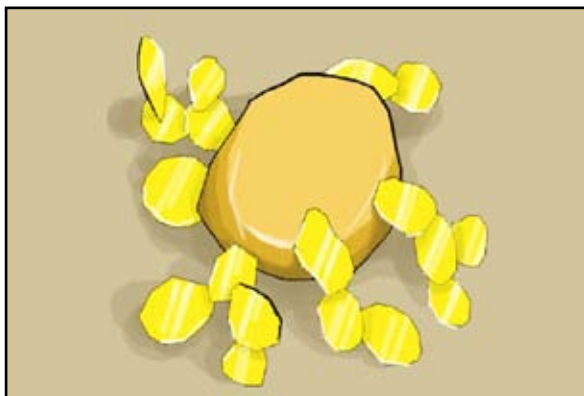
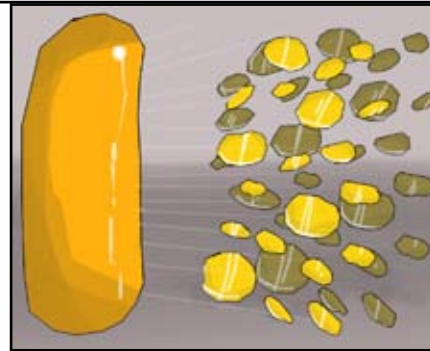
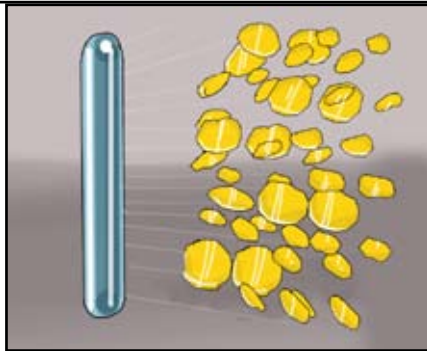


ELECTRICITY IS NOT CREATED BY FRICTION. IT IS ONLY COLLECTED IN ONE OBJECT AND REMOVED FROM THE OTHER. THE OBJECT IN WHICH THE ELECTRICITY GETS COLLECTED LET US CALL IT POSITIVE AND THE OBJECT FROM WHICH IT GETS REMOVED LET US CALL IT NEGATIVE.



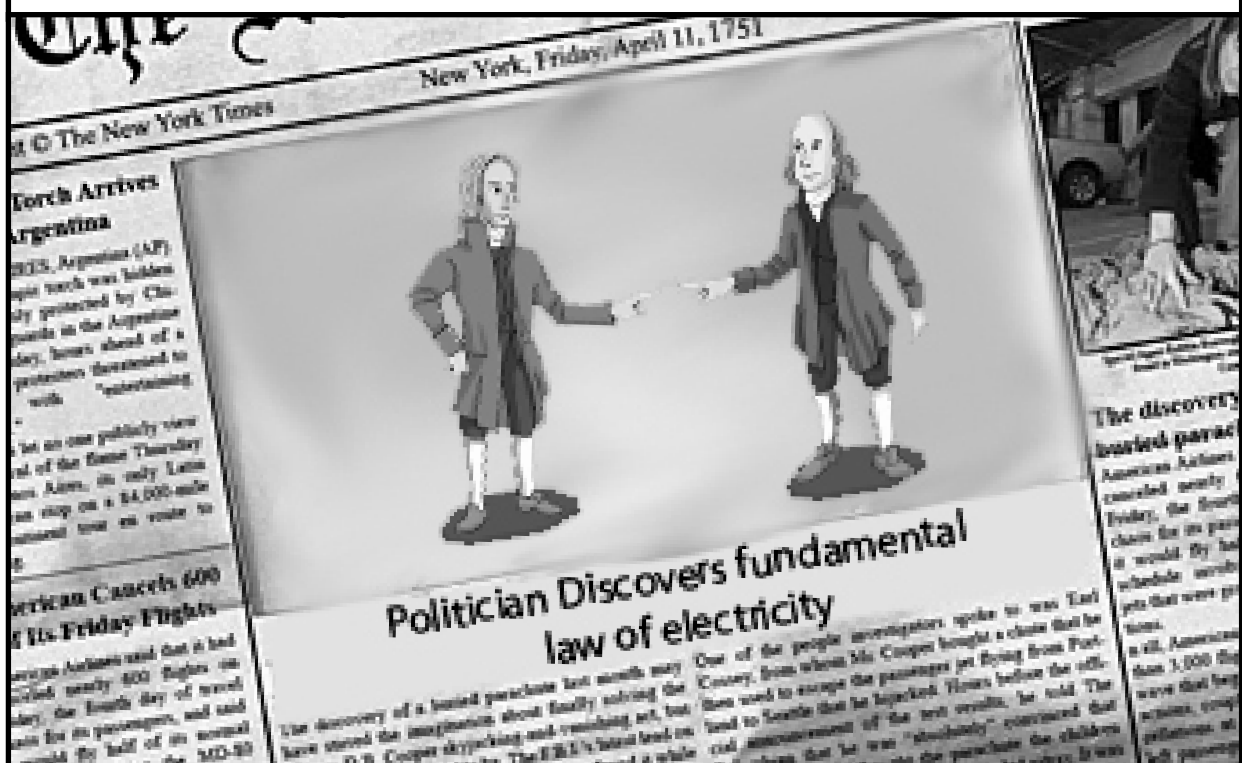
SO THE LAW OF ELECTRICITY IS THAT:

1. SAME ELECTRIC STATES, POSITIVE AND POSITIVE OR NEGATIVE AND NEGATIVE REPEL EACH OTHER

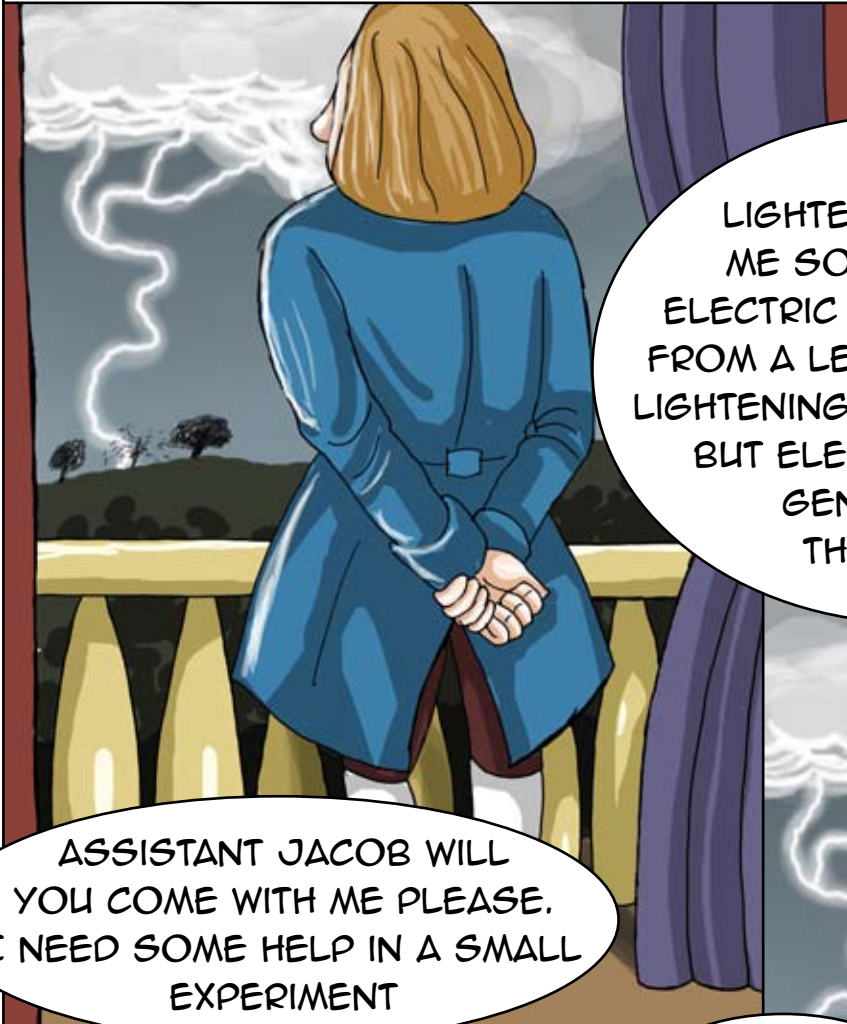


2. AND OPPOSITE ELECTRIC STATES POSITIVE AND NEGATIVE ATTRACT EACH OTHER.

SOON, THE NEWSPAPERS WERE FULL OF PRAISE FOR FRANKLIN'S DISCOVERY.



AFTER HAVING EARNED GREAT POPULARITY, ONE DAY FRANKLIN WAS RELAXING IN HIS HOUSE ENJOYING A FINE WHEATHER. THAT IS WHEN HIS ATTENTION FELL UPON THE PHENOMENON OF LIGHTENING



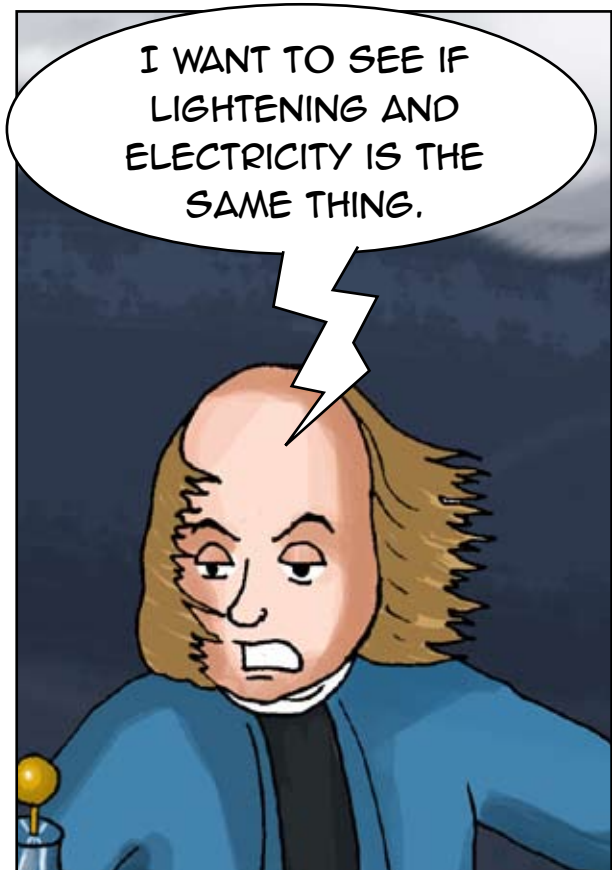
LIGHTENING REMINDS ME SO MUCH OF THE ELECTRIC FIRE THAT COMES FROM A LEYDEN JAR. COULD LIGHTENING ALSO BE NOTHING BUT ELECTRICITY THAT IS GENERATED BY THE CLOUDS

ASSISTANT JACOB WILL YOU COME WITH ME PLEASE. I NEED SOME HELP IN A SMALL EXPERIMENT

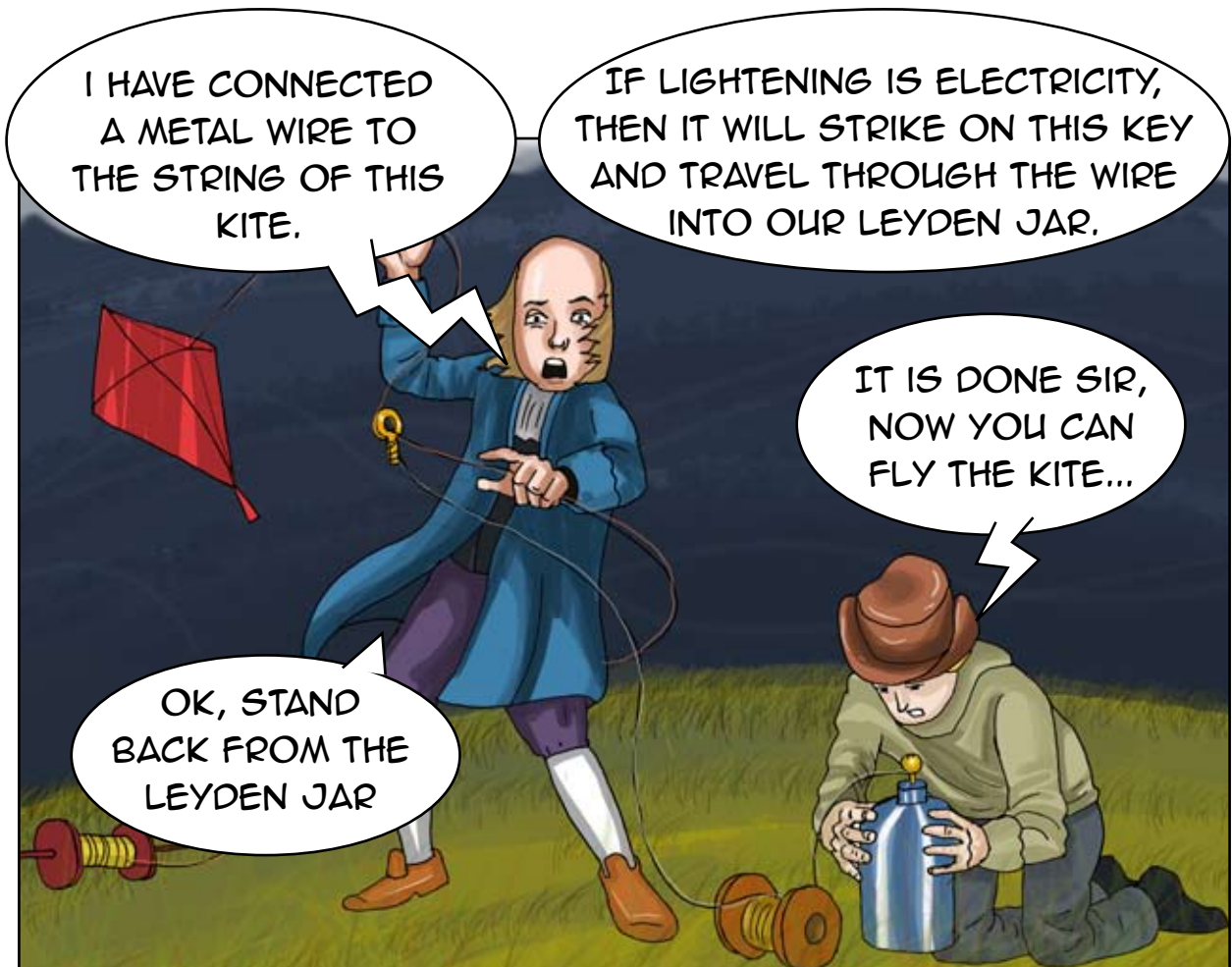
SURE SIR.







SHOW METAL WIRE AND STRING









I HAVE SOMETHING MORE USEFUL  
IN MIND.



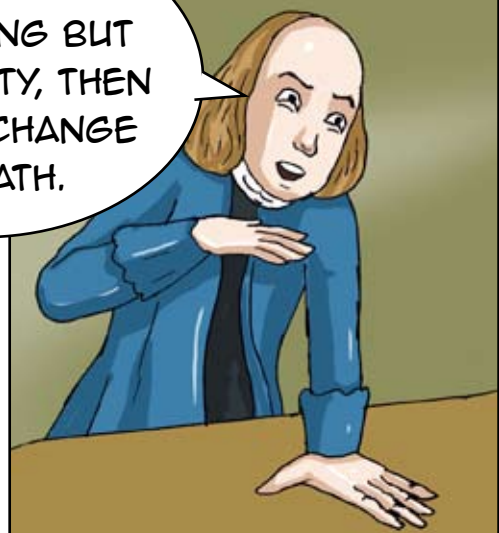
EVERY YEAR, THOUSANDS  
OF INNOCENT PEOPLE DIE  
BECAUSE OF LIGHTENING  
STRIKE.

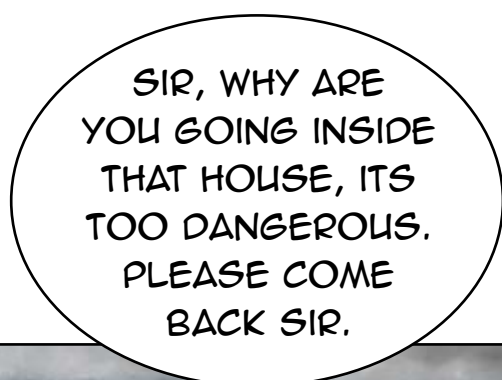


WHAT HAS THAT GOT  
TO DO WITH YOUR  
DISCOVERY SIR?



IF LIGHTENING  
IS NOTHING BUT  
ELECTRICITY, THEN  
WE CAN CHANGE  
ITS PATH.







OH MY GOD SIR THAT HOUSE IS DIRECTLY UNDER THE LIGHT-ENING ZONE... SIR, PLEASE COME BACK...



NOOOOOSSS!!!



WHAT???? IT CANT BE!!!





HOWS THAT POSSIBLE?



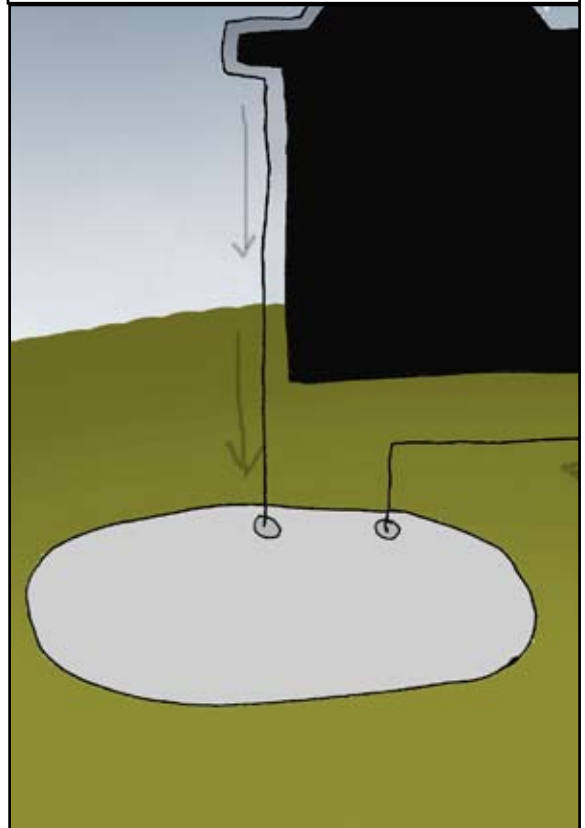
I PLACED A METAL ROD ON TOP OF THE BUILDING



LIGHTENING FALLS ON THE ROD AND THE ELECTRIC FIRE TRAVELS THROUGH THE CONDUCTOR WIRE CONNECTED TO THE ROD



THE CONDUCTING WIRE IS CONNECTED TO A METAL PLATE UNDERGROUND, AND SO THE ELECTRIC FIRE SAFELY GOES TO THE GROUND INSTEAD OF FALLING ON THE BUILDING



I SEE... BUT THEN, IF  
LIGHTENING IS ELECTRICITY,  
HOW IS ELECTRICITY  
PRODUCED IN THE SKY?



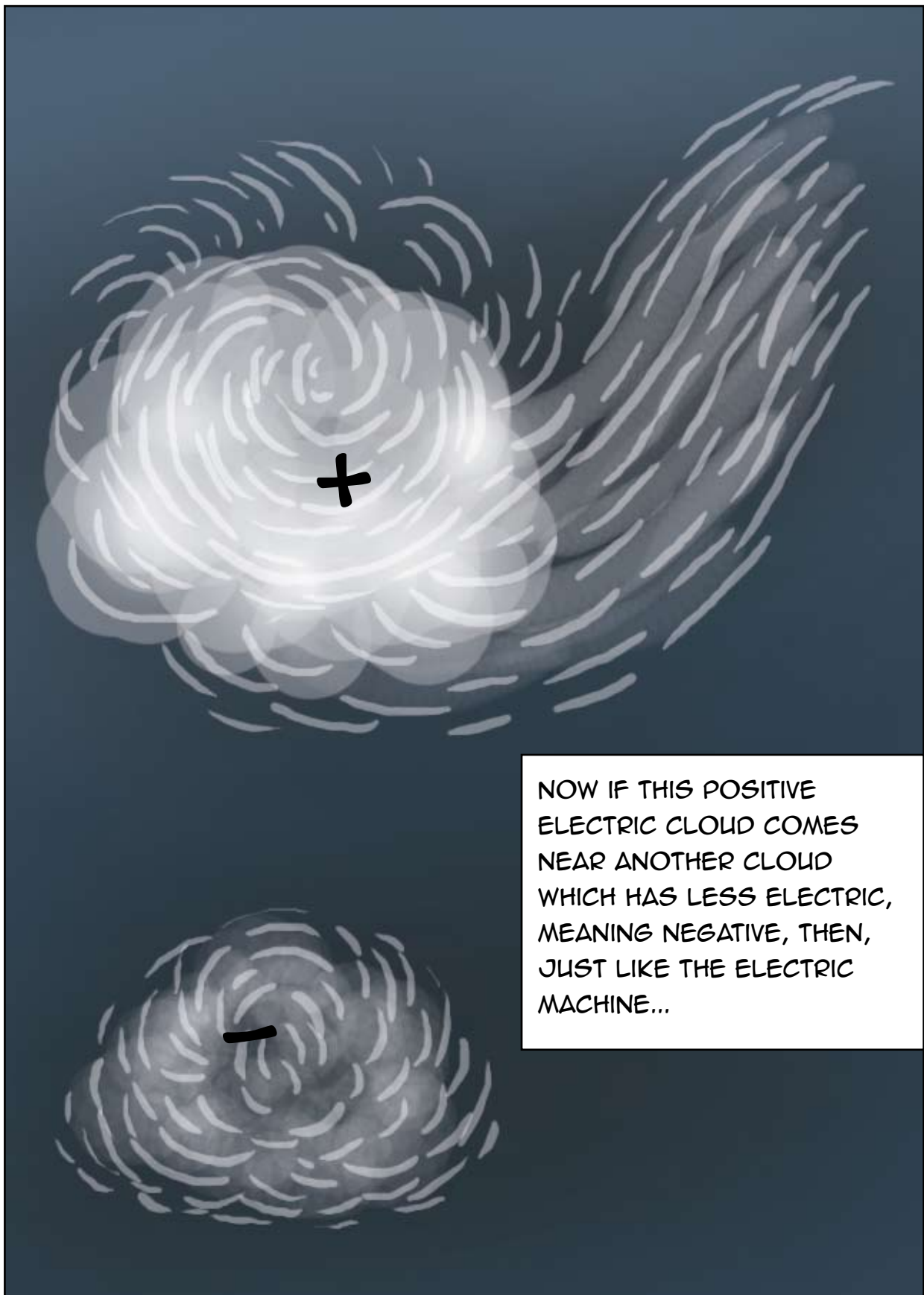
IT IS NOT PRODUCED.  
IT MOVES FROM ONE  
CLOUD TO ANOTHER.



IMAGINE, A CLOUD TO BE LIKE A BIG ELECTRIC  
GENERATOR MACHINE...



WHEN, THE CLOUD MOVES, IT RUBS AGAINST THE NEARBY AIR. AND HENCE COLLECTS THE ELECTRIC FIRE AND BECOMES POSITIVE ELECTRIC. JUST LIKE THE GLOBE OF THE ELECTRIC MACHINE





THE ELECTRIC FIRE TRAVELS THROUGH THE AIR BETWEEN THE POSITIVE AND NEGATIVE ELECTRIC CLOUDS. WHEN THE AMOUNT OF ELECTRIC FIRE BECOMES VERY LARGE, IT BREAKS THROUGH THE AIR GENERATING LOT OF HEAT AND LIGHT. AND THIS HEAT AND LIGHT IS WHAT WE SEE AND HEAR AS LIGHTENING AND THUNDER.



AND WHEN THE ELECTRICITY FLOWS FROM POSITIVE CLOUD TO NEGATIVE EARTH, THEN THE LIGHTENING FALLS ON GROUND. CAUSING DEATH AND DESTRUCTION



AND THATS WHEN THE METAL ROD COMES TO OUR RESCUE.



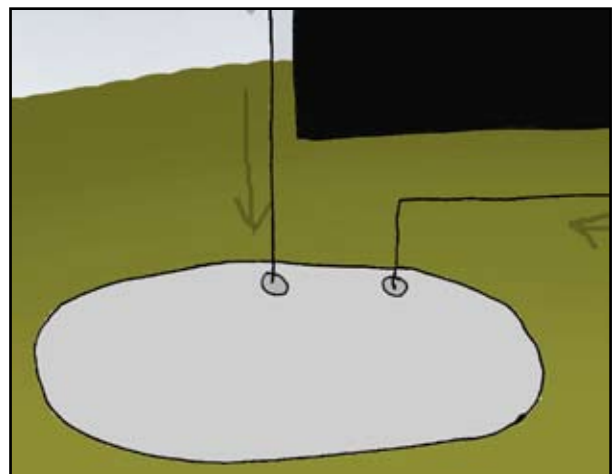
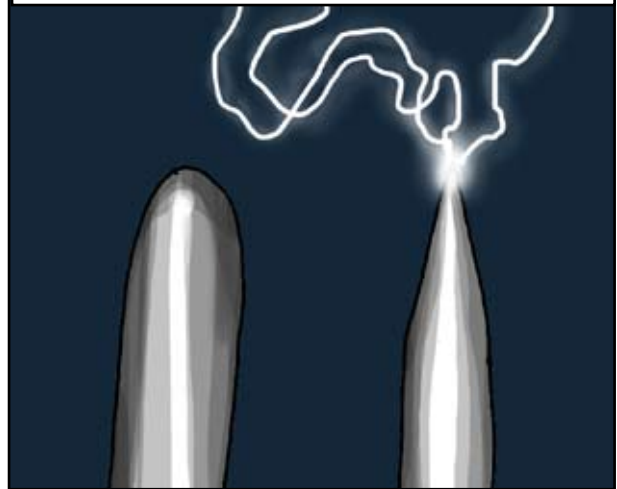
BUT WHY DOES THE LIGHTENING FALL ON THE LIGHTENING ROD AND NOT ON THE HOUSE



THATS RIGHT  
I CALL  
THIS ROD AS  
LIGHTENING  
CONDUCTOR



ELECTRICITY PREFERS  
THE SHORTEST AND  
FASTEST PATH TO TRAVEL  
AND THE POINTED SHAPE OF  
METAL ROD PROVIDES THAT.



VERY SOON, ALL HOUSES AROUND AMERICA AND EUROPE STARTED PUTTING LIGHTENING CONDUCTORS ON THEIR ROOFTOP AND IT SAVED MILLIONS OF LIVES.



IT WAS ALL BECAUSE OF ONE MAN, BENJAMIN FRANKLIN... WHO NOT ONLY TAUGHT US THE LAWS OF ELECTRICITY BUT ALSO HOW TO USE THE LAWS TO PROTECT OUR HOMES...





THATS IT. I CANT REMAIN  
IN THE CONFINES OF THESE  
WALLS ANY MORE. I WILL BE A  
SCIENTIST AND CARRY THE  
FLAME OF SCIENCE  
FORWARD...

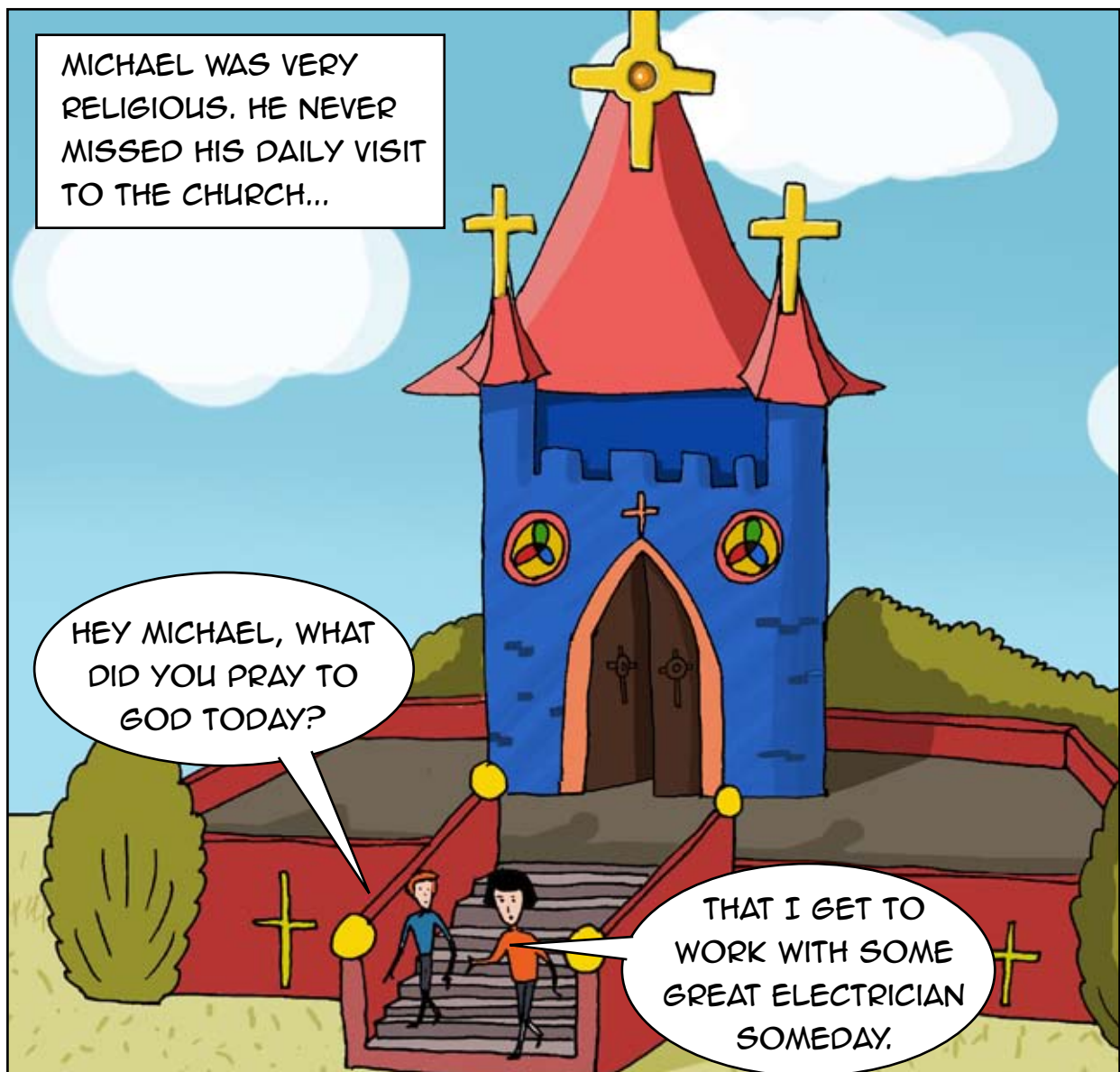


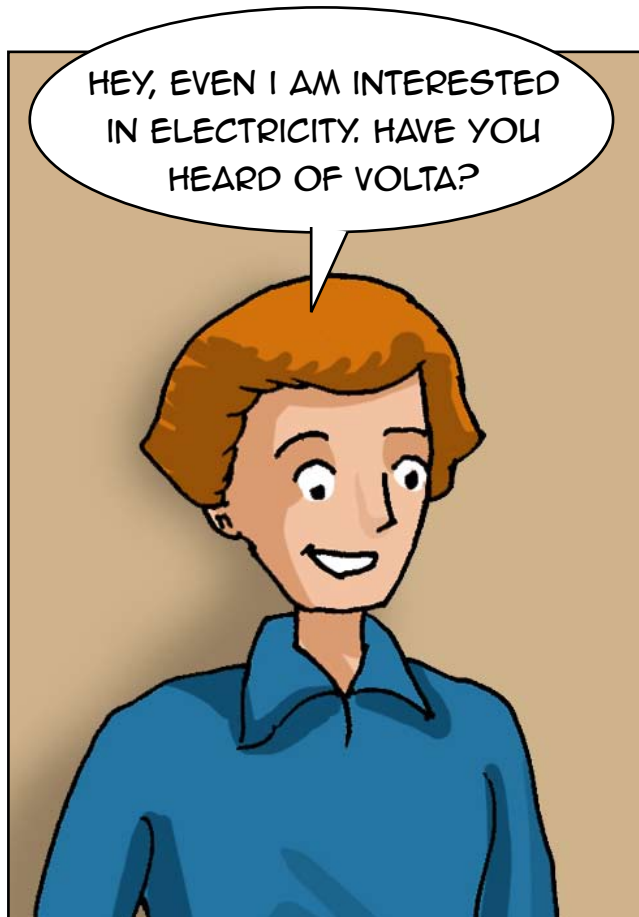
AND SO MICHAEL CAME  
OUT OF THE WORLD OF BOOKS  
AND DECIDED TO DO HIS OWN  
EXPERIMENTS IN REAL WORLD...

I WANT TO HAVE ONE  
GLASS ROD, AN ELECTRIC  
MACHINE, SOME GOLD FOIL  
AND A LEYDEN JAR

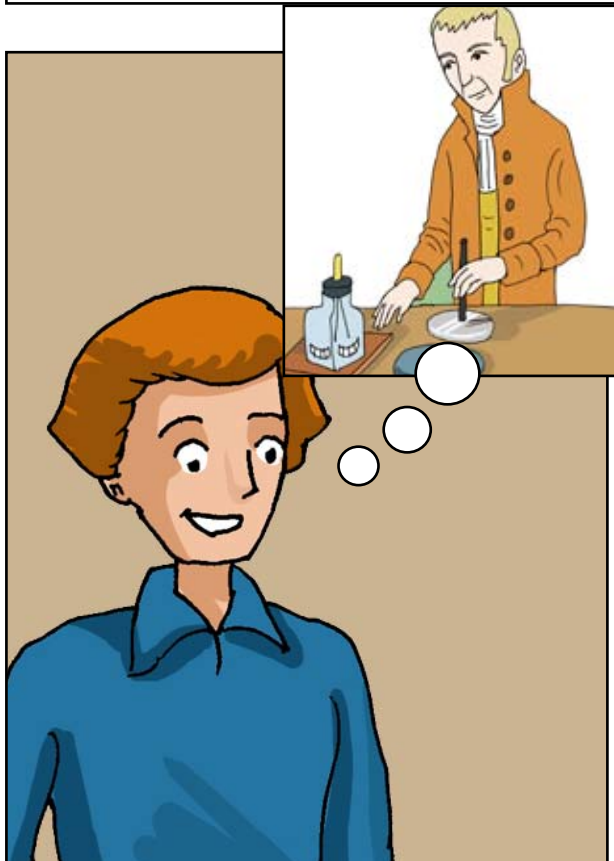
SURE, BUT THAT  
WILL COST YOU A 100  
POUNDS. DO YOU HAVE  
THE MONEY?



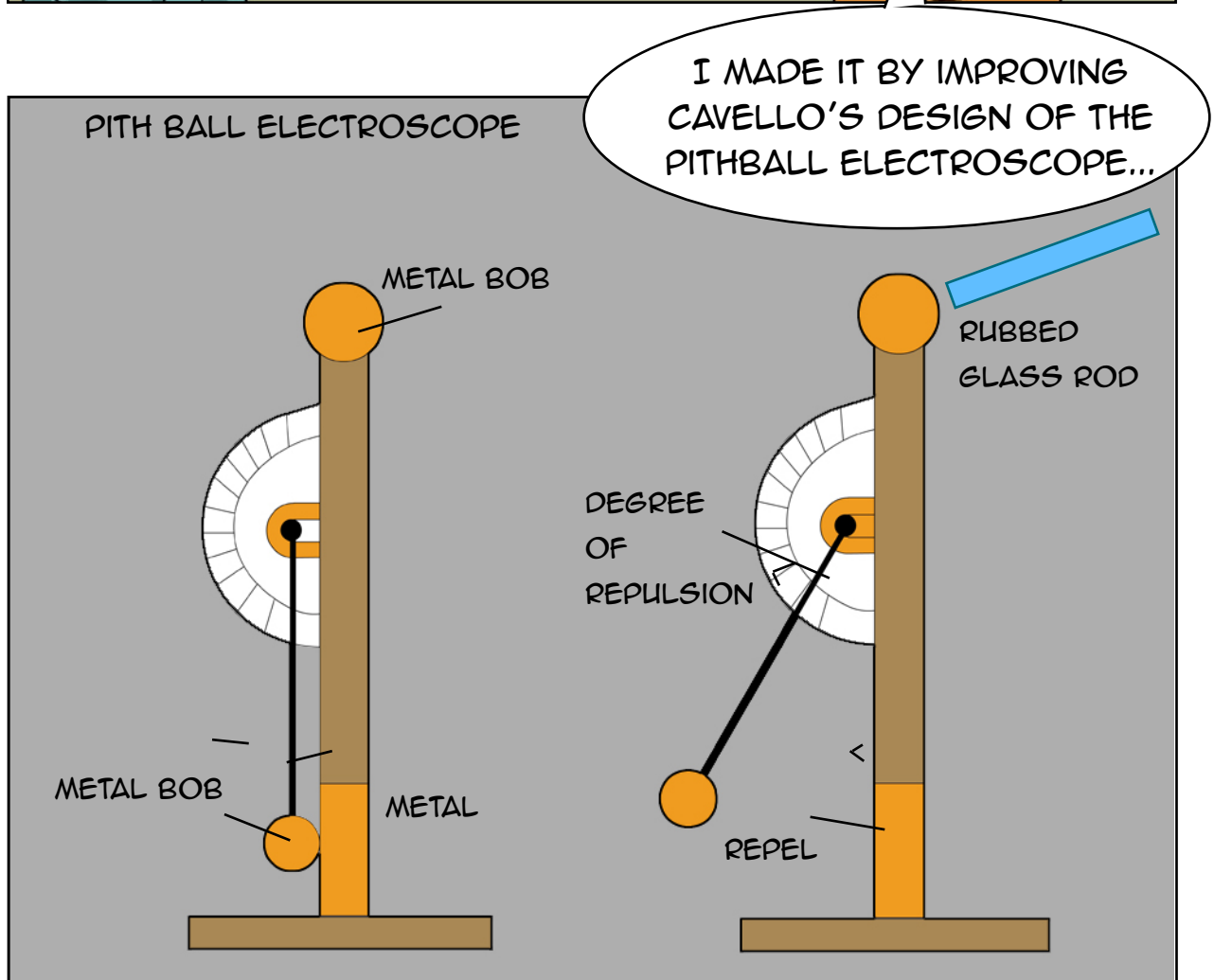
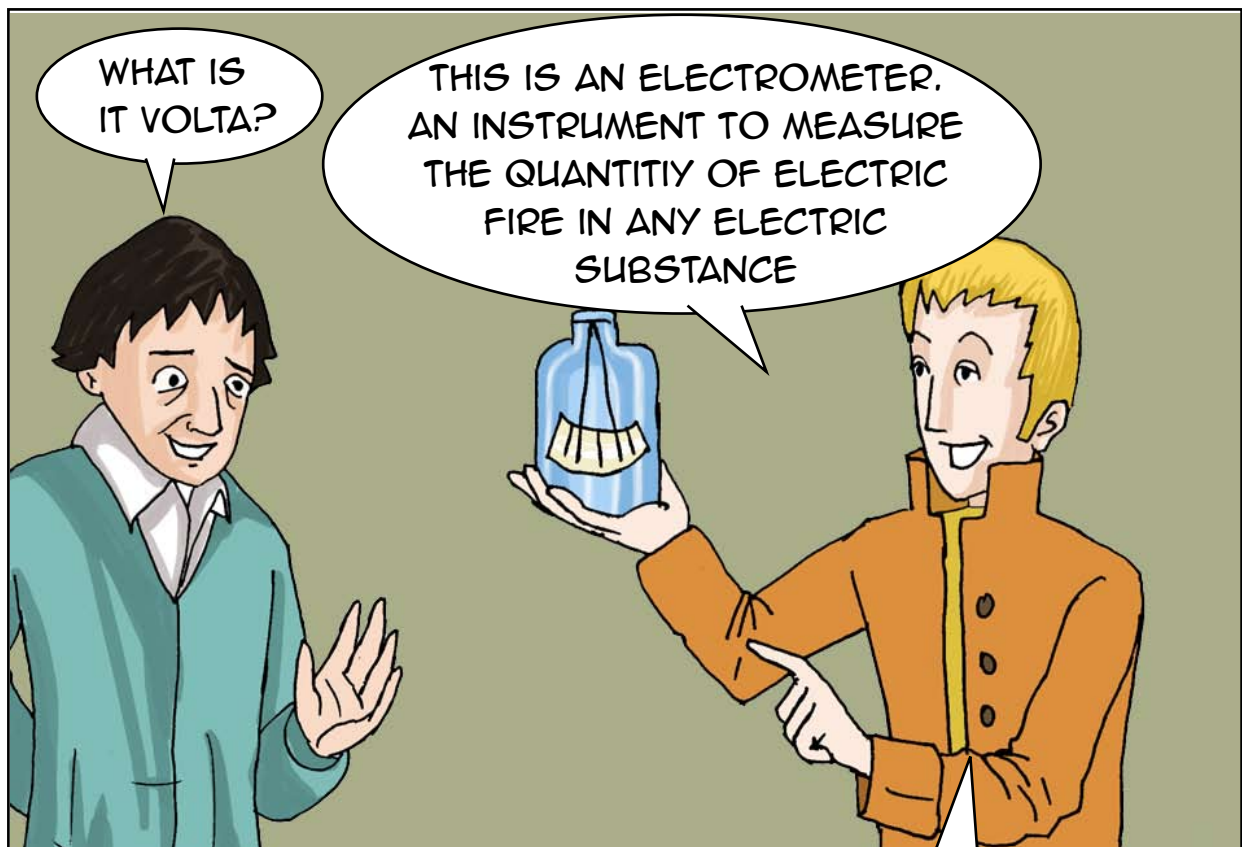




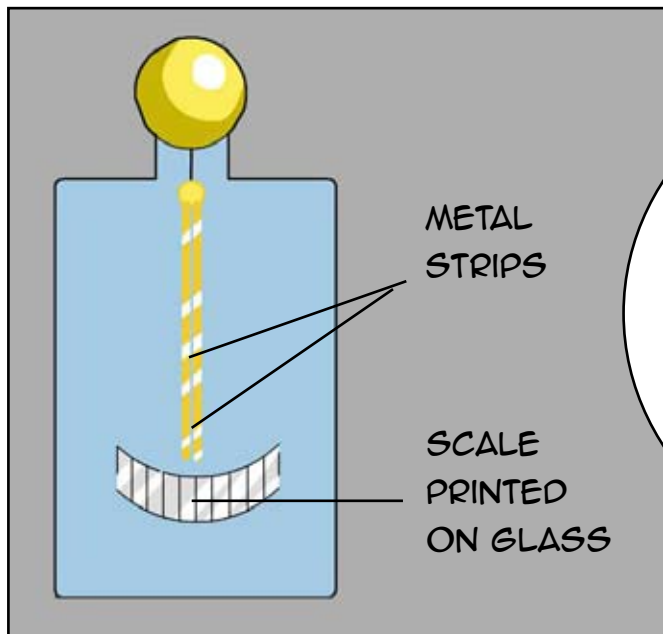
VOLTA IS A PHYSICIST WHO LIVES IN ITALY.



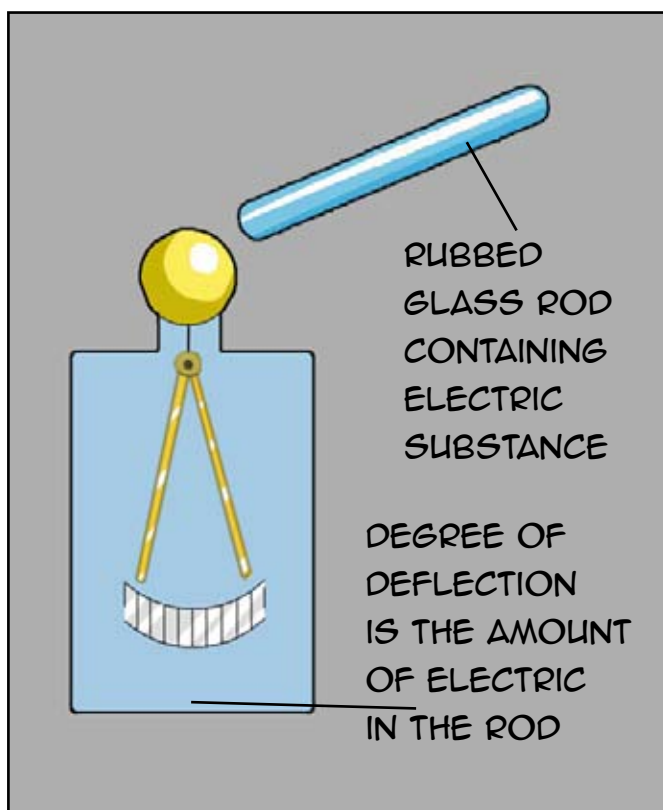




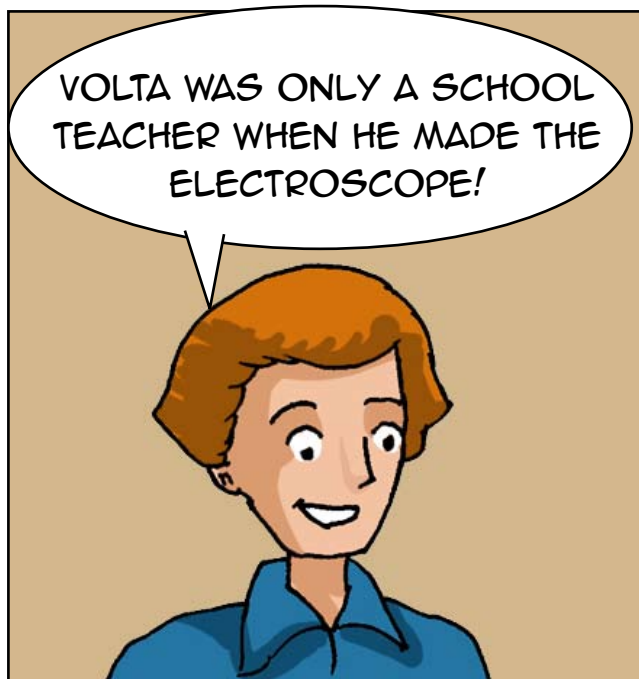
## HOW DOES IT WORK?



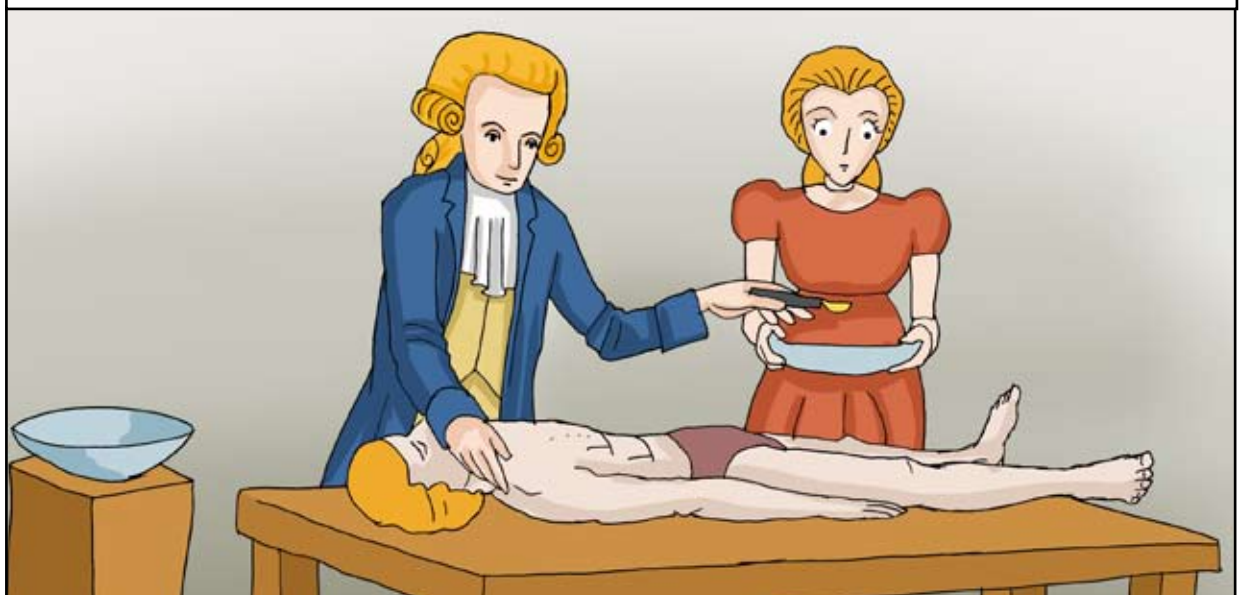
IT CONSISTS OF TWO METAL STRIPS HANGING FROM A METAL BOB. WHEN A RUBBED ELECTRIC IS BROUGHT NEAR THE BOB, THE ELECTRIC FIRE GETS TRANSFERRED TO THE METAL STRIPS AND THEY REPEL EACH OTHER...



WE CAN MEASURE THE AMOUNT OF ELECTRIC FIRE PRESENT IN THE ELECTRIC MATERIAL BY RECORDING THE EXTENT TO WHICH THE METAL STRIPS DEFLECT...



HE IS A PROFESSOR OF ANATOMY AT UNIVERSITY OF BOLOGNA IN ITALY. HE CLAIMS TO HAVE FOUND A NEW FORM OF ELECTRICITY, HE CALLS IT ANIMAL ELECTRICITY.

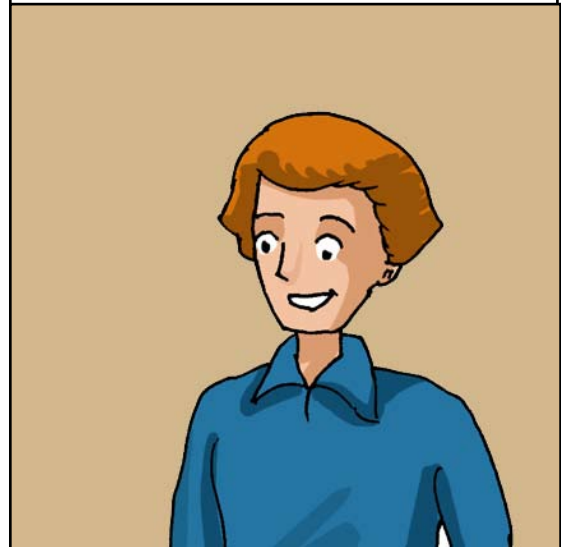




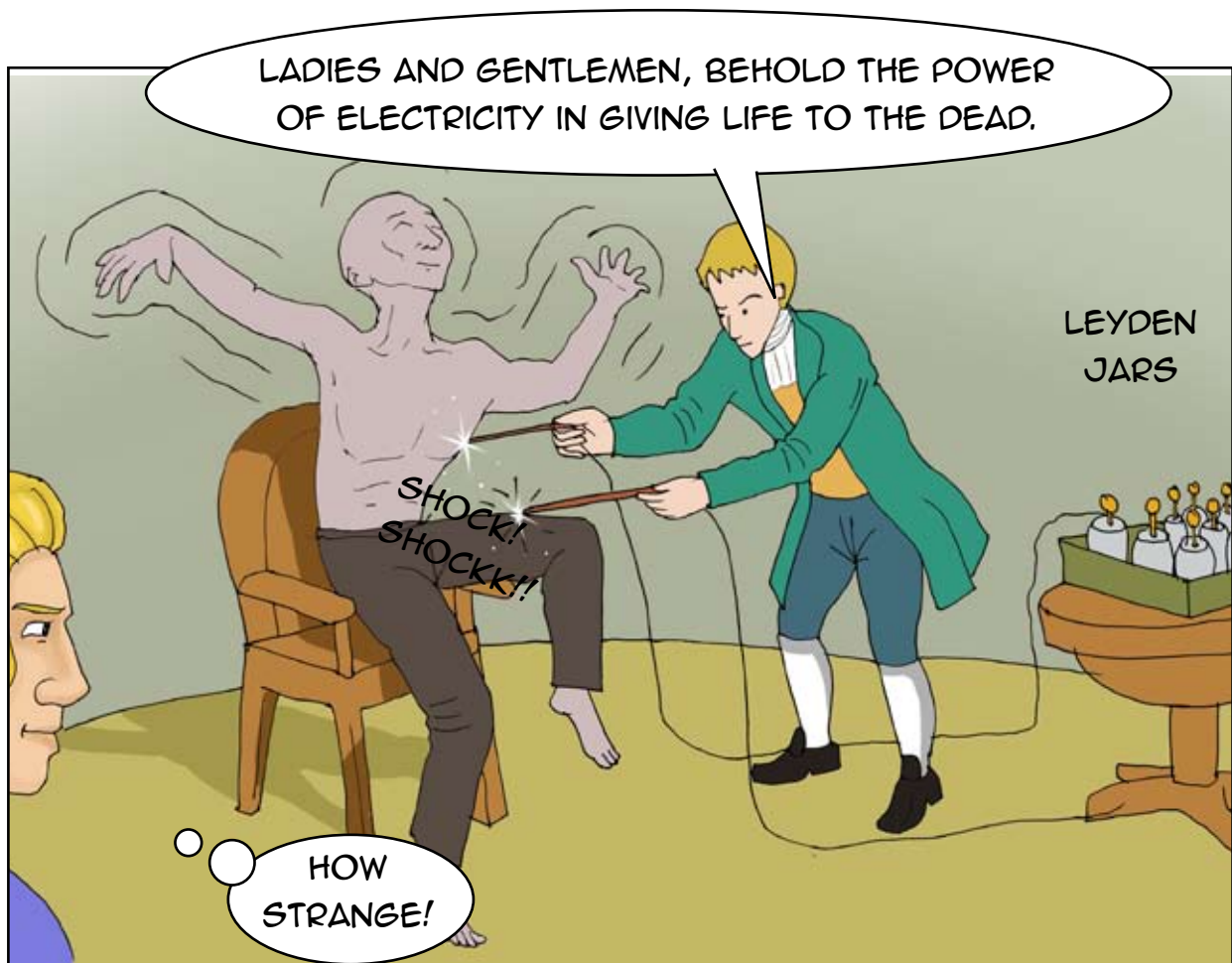
ANIMAL ELECTRICITY? I HAVE NEVER READ ANYTHING ABOUT IT. DOES ANYTHING LIKE THIS REALLY EXIST?



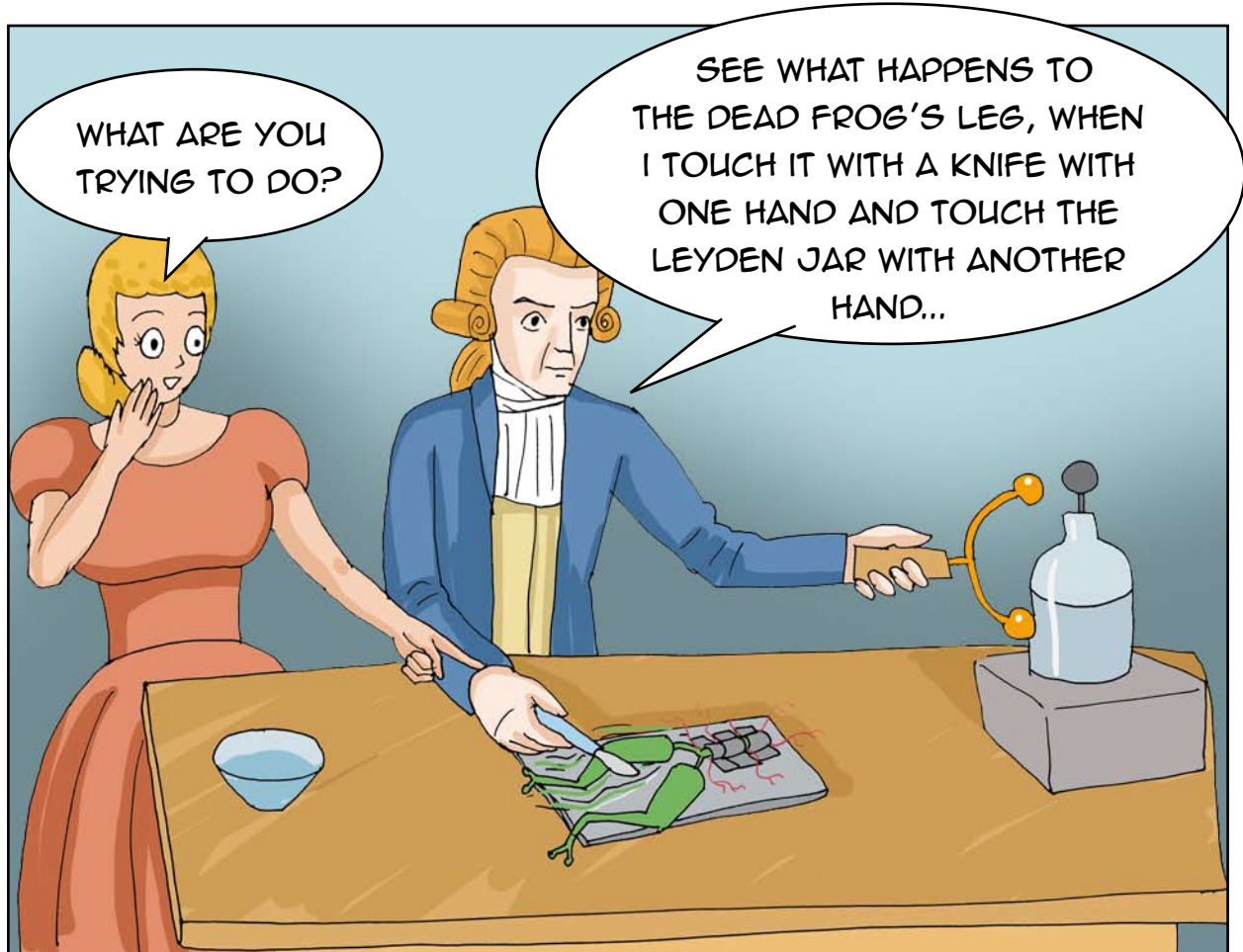
LOUIS GALVANI ACTUALLY CLAIMS TO HAVE SEEN IT.

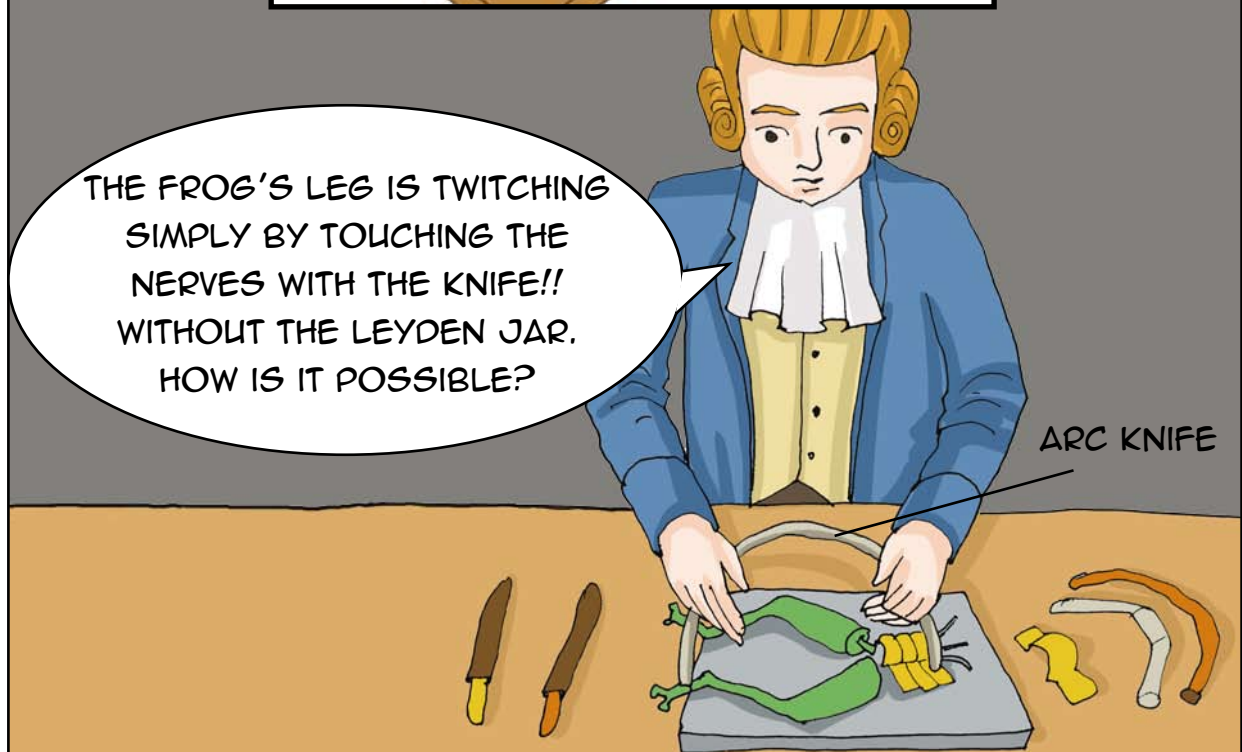
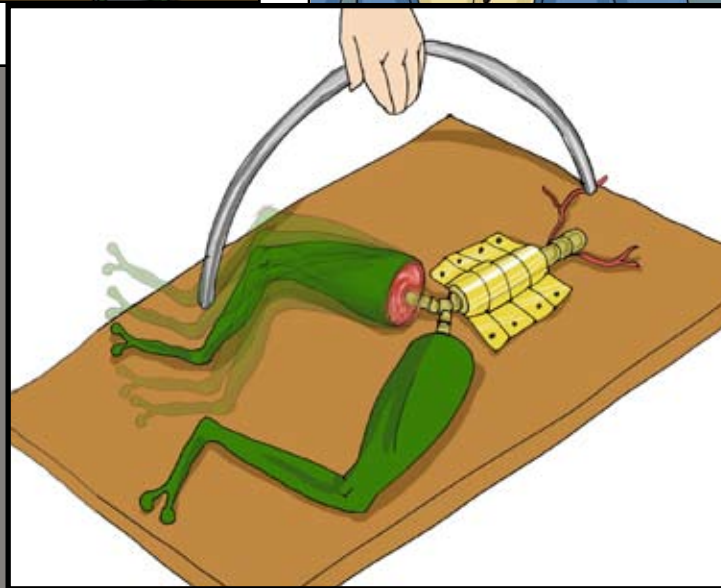
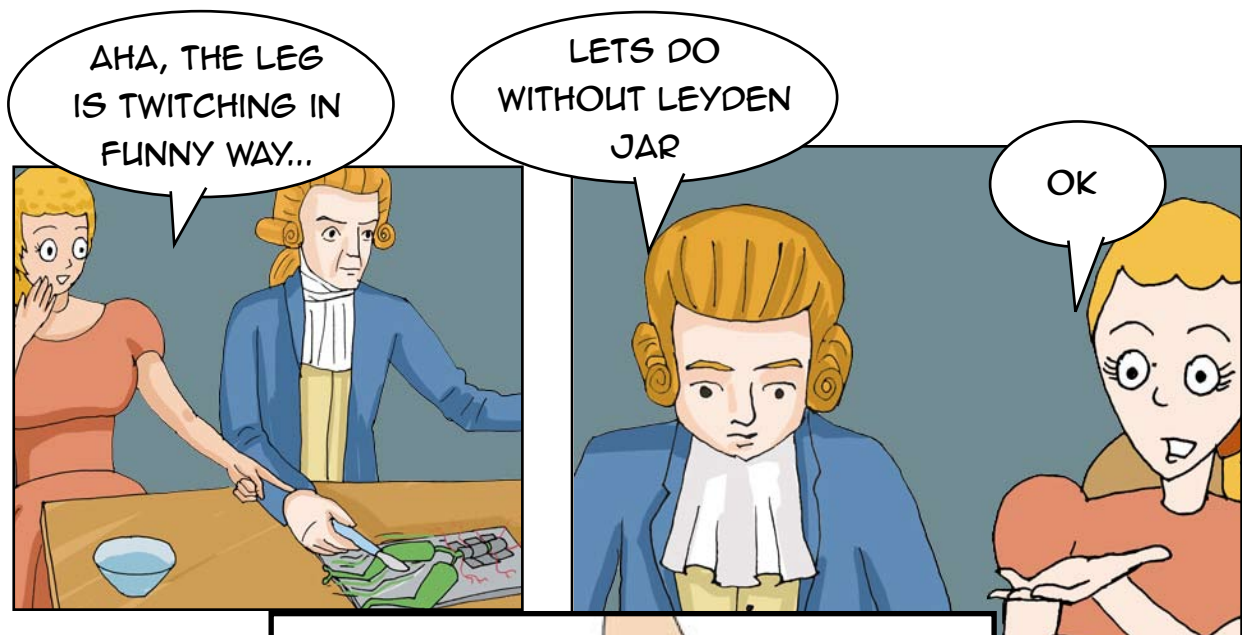


ONE DAY GALVANI SAW A STRANGE DEMONSTRATION...

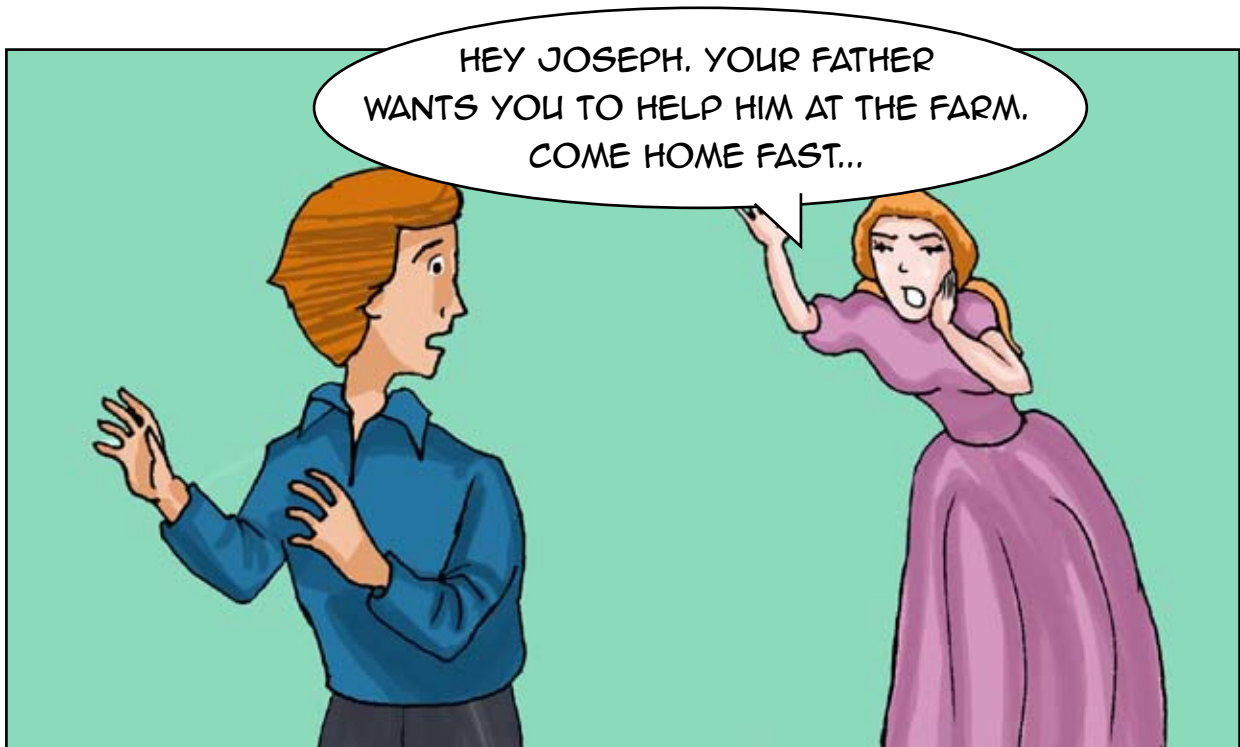
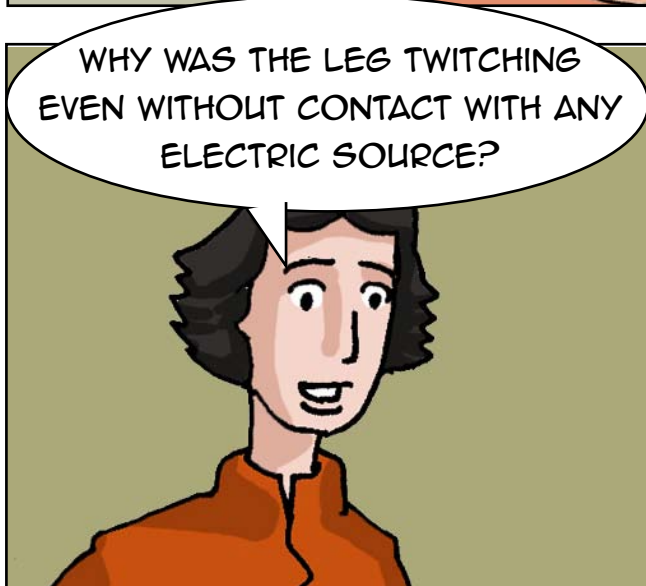


GALVANI GOT AN IDEA FROM THE SHOW AND RUSHED BACK HOME TO TEST IT.











IN THE NEXT VOLUME,  
READ ABOUT THE HEATED  
DEBATE BETWEEN GALVANI AND  
VOLTA ABOUT THE EXISTANCE OF  
ANIMAL ELECTRICITY!  
AND THE CREATION OF A  
REVOLUTIONARY SOURCE OF ENERGY  
THE ELECTRIC BATTERY...  
AND MANY MORE...